BOARD MEMBERS AND COOPERATIVE MANAGERS' ATTITUDES TOWARD VALUE-ADDED ACTIVITIES

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CHAPTER I

INTRODUCTION

Background and Introduction

Producers and producers' organizations have recognized value-added opportunities and are actively considering more investments. During the last ten years there has been a rapid growth in cooperatively organized value-added businesses in Northern Plain states such as North Dakota, South Dakota and Minnesota. Many of these businesses are organized as closed cooperatives with a substantially different structure relative to traditional marketing cooperatives. Because of the success of cooperatives in the Northern Plains, the Oklahoma Agricultural Cooperative Council, local Oklahoma cooperatives, and groups of Oklahoma agricultural producers have expressed interest in value-added enterprises. In addition to producer's interest, Oklahoma legislature has also passed legislation designed to encourage cooperatively organized value-added activities.

Farmers received for their wheat, 8% of the retail value of bread in 1987 and they received for their wheat the equivalent of 7% of the retail value of bread in 1997. Over time the percentage that farmers receive has decreased and the portion that goes to processing and marketing services has increased (Agricultural Fact Book). Adding value to agricultural products is a popular concept because it can provide substantial benefits, including an increased ability to capture a percentage of the farm-to-retail price spread.

In addition, the average national price of wheat in 1996 ($3.49) did not cover the economic cost in most of the U. S. wheat production areas. It only covered cash cost and capital replacement (U.S. Department of Agriculture). In contrast tortillas, a wheat product with value-added industry, is considered the fastest growing segment of the baking industry (Tortilla Association). To support this from a profit perspective, the average return on investments for agriculture production was 3% during the period 1991-95 whereas the average return on

investment for food firms was 16% in the same period (Kenkel and Lyford). It seems that processing activities are more attractive options because besides increasing farmers' income they could diversify farmers' investment options into a high return area.

Furthermore, the emerging farm and food technology increases the possibility of producing products with specific characteristics for a specific segment of market and consumer expectations, as the availability of these products expand (Barkema and Drabenstott). An advantage for farmers owning a processing plant is that they do not have to depend on others for high quality raw materials because they produce it and can select the most appropriate for processing purposes. This provides an advantage over firms that have to buy raw material from others.

The increased activity, by existing agricultural cooperatives in developing value-added enterprises along with the demand of assistance to Oklahoma State University in regard to value-added enterprise development, and the establishment of new, alternatively structured cooperatives, has generated a need for more information. Currently, relatively little is known about the attitudes of cooperative managers and board members toward value-added activities and their perceived strategic role. This situation has highlighted a need to better understand producers' interest in value-added activities and how universities and other entities can facilitate the development of value-added agricultural enterprises in Oklahoma.

The increased interest in value-added activities also raises issues relative to the attitudes of cooperative managers and members of the board of directors toward these projects. Because these two groups have a joint role in developing and implementing a cooperative's strategic plan, identifying key differences in attitudes toward value-added projects could be extremely useful, both to the cooperative industry and the various resource personnel involved in assisting these groups. Understanding each other (managers and board members) attitudes may also increase their synergism leading the cooperative.

Another area in which information is needed is in regard to impediments to develop cooperatively owned value-added activities. The transition of cooperatives and producer groups into the value-added arena may create new needs for support and assistance. The information is useful not only for land grant universities, industry organizations but also for legislators to allocate state resources.

Objectives

The overall purpose of this study is to understand attitudes of the board members and managers of Oklahoma cooperatives toward value-added enterprises.

Specific objectives are:

1. Investigate attitudes and perceptions of board members and cooperative managers toward value-added activities, impediments to developing value-added projects, and attitudes toward new generation structure for agricultural cooperatives.
2. Identify similarities and differences between board members and managers of agricultural cooperatives toward value-added activities and the new generation structure.
3. Identify differences between board members and managers that come from cooperatives that have more experience in value-added enterprises with those that come from cooperatives with less experience.

Scope of the study

This study focused on board members and managers of the 7 largest cooperatives of Oklahoma. This group was selected because it was judged most likely to be in a position to develop value-added enterprises. Larger cooperatives have more potential to provide the high initial investment required for these types of projects as well as a constant supply of raw material

for processing. It is also more likely for large cooperatives to have the management capacity and organization resources to investigate and successfully implement these types of projects.

The study analyzes factors like background information, previous experiences in value-added enterprises, factors that motivate initiating value-added activities, and activities that are considered appropriate when working with value-added ventures. In addition, factors to consider when selecting value-added activities, are perception about New Generation Cooperative (NGC) structure, level of interest in value-added activities, perception of risk associated with value-added activities, and perceived limitations to start value-added activities were analyzed.

Organization of the study

This study is presented in four chapters including the introduction, which is chapter I. Chapter II is the review of literature and conceptual framework, which includes information about cooperative structure governance, federal Oklahoma legislation, and incentive programs in Oklahoma. Chapter III provides a description of the procedures used to collect and analyze the data, a brief description of the econometric models, and discussion of the results. Finally chapter IV presents the conclusions and implications that can be drawn from the research.

CHAPTER II

REVIEW OF LITERATURE AND CONCEPTUAL FRAMEWORK

This study deals with perception of board members and cooperative managers toward value-added enterprises; therefore, a brief discussion, of topics that are related to the context in which cooperative leaders perform their duties, is presented. Structure of agricultural cooperatives, and cooperative governance issues are important to understand the environment in which those persons work. In addition, since the new generation structure is considered in the study, features of new generation cooperatives and some historic events are discussed. Finally, the legal foundation of agricultural cooperatives, Oklahoma cooperative legislation, and incentive programs for cooperatives value-added activities are included in this chapter because legislation defines the framework in which value-added enterprises work.

Structure of Agricultural Cooperatives

Since this study deals with agricultural cooperatives it is important to define a cooperative. The International Cooperative Alliance (ICA) is accepted as the final authority for determining the underlying cooperative principles throughout the world. ICA's definition (Hoyt) of cooperative in 1995 is "an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations throughout a jointly-owned and democratically-controlled enterprise."

A better understanding of the unique aspects of the cooperative firm can be obtained by contrasting it with an investor-oriented corporation. Both cooperatives and investor-oriented corporations can provide products and services. Both may operate similar facilities. However, the two forms of business differ in ownership, governance, return to capital and profit distribution. Table 1 shows main differences between an investor-oriented corporation and a cooperative.

Table 1. Comparison of investor oriented corporation and traditional cooperative

Features	Investor Oriented Corporation	Traditional Cooperative
Who uses the service?	Generally non-owner customers	Chiefly the owner patrons
Who owns the business?	The stockholders	The member-patrons
Who votes?	Common Stockholders	The member-patrons
How is voting done?	By shares of common stocks	Usually one-member one-vote
Who determine policies?	Common stockholders and directors.	The member-patrons and directors.
Are return on ownership capital limited?	No	Usually 8%
Who gets the operating proceeds?	The stockholders in proportion to stock held.	The patron on a patronage basis.

Source: Ingalsbe and Kirkman, Jr. 1988

Member-patrons are customers, who own and govern cooperatives, whereas in investor oriented corporation customer with no equity interest uses the services. Investor oriented corporations are owned and governed by stockholders, who are not necessarily customers. Cooperatives are also limited to 8% annual return on ownership capital. In contrast, in an invested oriented corporation there are no limits to the return on equity of investors owned firms, and the goals of the firm is to maximize the return on invested capital. In addition, cooperatives have special rules to manage equity, because cooperatives equity is not bought and sold but rather is acquired as a condition of membership. Finally, cooperatives must distribute all annual profit to their members, from which up to 80% of the profit distribution can be in the form of stocks instead of cash (Ingalsbe and Kirkman).

Cooperative Governance Issues

Even though cooperatives and investor owned firms have similar business functions they have different governance systems (Agricultural Cooperative Service). The general membership,

the board members, and the manager all participate in the administration of the cooperative but they have specific roles (University of Wisconsin Center for Cooperatives).

Cooperative members have two roles in the cooperative. The first role is as a daily customer or user of the organization. The second role is as a stockowner. Many members consider their ownership role only periodically, such as when they receive patronage dividends or equity redemption (Cook). Members express their concerns by approving or disapproving important policies in the cooperative (MacBride). Since it is not possible to make everybody participate in each decision members elect a board of directors and provide them the authority to make decisions (Hoyt).

The dual customer and ownership role with the organization becomes particularly important for members serving as board members. As in investor owned firms, the role of the board members is to provide strategic leadership and control and oversee the activities of the general manager. Board members can face inherent conflicts when actions, which may be in the best long-term interest of the cooperative, have adverse effects on their individual activities as customers. These conflicts become particularly apparent when cooperatives consider activities that affect different classes of customers differently.

Managers in cooperatives are similar to managers in other kinds of business but they also face unique challenges (Cook). Cooperative managers face more vague and complex organizational objectives and need a capacity to create group cohesiveness. Cooperative managers are often expected to place more emphasis on facility operations and human resource management than managers of investor owned firms, which are more likely to be evaluated on financial performance. Cooperative managers are also more likely than managers of investor owned firms to be involved with resolving conflicts between membership groups. Table 2 shows a summary of board members and managers responsibility areas.

Table 2. Contrast of board member and manager responsibility areas.

	BOARD	MANAGER
Accountability	To Members	To Board
Areas of concern	• Ideas Decision, judge • Ends/Purpose	• Action Decisions, Manage • Means/Activities
Commitment of Resources	• Determine Values • Long Range, Consequential • Set Limits, Monitor	• Intermediate and Short Range • Organize and Control Resources
Information	Request, Review	Develop, Analyze, Provide
Goals, Policies	Determine	Implement
Management Evaluation	• Set policies Regarding Results to be Achieved and Limitations on Activities. • Monitor Progress Toward Results. • Monitor Compliance with Limits.	Provide Information for Monitoring
Operations	• Determine Values and Goals • Set Limits • Monitor	Conduct
Perpetuation	• Assurance of Capable Management and Board Succession.	Support, Participate
Board Process	Determine Structure, Behavior, Performance Evaluation, Calendar and Agenda	None

Source: University of Wisconsin Center for Cooperatives, 1998

Although boards of directors and managers have specific activities, some duties must be performed together. A survey conducted on cooperatives found that some decisions are shared between the manager and the board members (University of Wisconsin Center for Cooperatives). For example, relations with government, industry and general public, amount and source of working capital, distribution of earnings, and authorizing facility construction and expansion are decisions generally shared between boards of directors and managers.

The cooperative governance structure provides some challenges for cooperatives attempting to diversify into value-added enterprises. Cooperative managers and board members are often unfamiliar with market conditions, market trends and competitive situations for value-added products. When cooperatives consider activities, which add value to crops the cooperative handles, board members may be reluctant to view quality requirements from the end-user's viewpoint and instead focus on the commodity characteristics, which they currently produce. In contrast managers could be interested in requesting a high quality commodity to assure a better product from the processing activity. Finally, the cooperative equity structure in which equity is continually redeemed may provide managers with incentives to develop value-added enterprises, which creates unallocated profits. A successful year of cooperative's traditional business enterprise generates profits, which are allocated to the members. Because some of the distributions are made in the form of stocks, profitable years generate a source of cash in the year in which the profits occur. However, this structure also creates a cash flow drain for future years when the equity is redeemed. Cooperative managers might be expected to prefer value-added business structures since the profits from these businesses are generally not allocated to the members and thus do not generate the cycle of stock dividends and eventual redemption.

Features of New Generation Cooperatives and Some Historic Events

A recent development in agricultural cooperatives is the growth of closed cooperatives, which often focus on value-added products rather than commodities (Cropp). These organizations, which are often referred to as New Generation Cooperatives, have modified some of the traditional elements of cooperative structure. NGC normally have a system with higher initial membership contribution and fast repaid equity, agreements for members to deliver a specified quantity and quality of product, membership is limited to the initial membership, and the stock or delivery rights can appreciate in value and be traded. Table 3 illustrates the main differences between traditional cooperatives and NGC.

Table 3. Comparison of traditional and new generation cooperatives

Characteristic	Traditional	New Generation
Membership eligibility	Any Producer	Limited number of initial members
Initial investment	$25	$4/Bu ($4/share stock)
Delivery rights	Unlimited	1 Bu. Per share stock
Quality accepted	Wide range of quality	Strict Quality specifications
Payment at delivery	Market Price	Contract price
Patronage dividend	30% cash 70% stock	100% cash
Stock redemption	Redeemed at par value ($25)	None
Value of delivery rights	None	Variable, increases with profitability
Voting	One member-one vote	Depends.

Source: Kenkel and Lyford, 1997

States in which NGC have succeeded have some common characteristics. They have a strong agricultural production, an entrepreneurial attitude within the farmer community, and support programs that facilitate growth of value-added businesses (Kenkel et al., 1998).

For example, facing a declining rural population and depressed economy due to the oil bust in the 1980's stimulated North Dakota residents to seek for solutions. A plan called Vision 2000, supported by The Greater North Dakota Association, a statewide chamber of commerce, evaluated the state economy and prepared a plan for development. The plan included components for agriculture, energy, manufacturing, and service industries. In 1990 the governor's office joined vision 2000 to form a program called "Growing North Dakota". As a result the Agricultural Products Utilization Commission was expanded. One of its programs was designated to develop innovative marketing strategies (Cobia).

Some successful results were obtained from these efforts. The North Dakota Association of Rural Electric Cooperatives hired an economic development specialist and awarded non-interest-bearing loans. These support efforts led to the successful formation of sugarbeet cooperatives in the early 1970's. These cooperatives had a non-traditional structure with respect to member investment; they also pioneered a system of transferable delivery rights and obligations (Cobia).

The roots of the growth of Minnesota value added cooperatives occurred during the early 70's. Minnesota found cooperatives convinced that they needed to upgrade their equipment,

relocate stores and expand facilities. However, banks were often unwilling to take the risk of lending money to cooperatives, partially because of their lack of familiarity with cooperative structures. As a response to these problems, cooperative leaders created the Northcountry Cooperative Development Fund (NCDF). Seven food cooperatives pooled their capital and established a loan program for cooperative business development. The original seven cooperatives have grown to more than 80 across nine states in the upper Midwest. The financing assistance of the NCDF is available in urban and rural areas primarily in Minnesota and Wisconsin (Lund).

Some of the NGC, such as American Crystal Sugar, Dakota Growers Pasta Cooperative, and Minnesota Corn Processors, have established prominent success. American Crystal Sugar had revenues of $542 million in 1993 and Minnesota Corn Processors is one of the world's larger ethanol producers with a processing capacity near 70 million bushels (Alster).

Because NGC have not been established in Oklahoma (as of the date of this manuscript), the attitudes of cooperative managers, board members and members toward this structure are not known. It is expected that managers provide more importance to select the option that provides the best return on investment. On the other hand board members may provide some importance to other issues such as logistic to transport crops, community relationships, etc. Hence, if managers perceive NGC as a possibility of a more profitable allocation of resources they may be more attracted to the establishment of a NGC structure.

Legal Foundation of Agricultural Cooperatives

The U. S. legal system has traditionally disapproved of anything that could reduce trade competition (Farmer Cooperative Service). Prior to the enactment of specific legislation enabling agricultural cooperatives, restraint of trade laws affected farmers joining in a common activity. Some of the important legislation impacting U. S. cooperatives are the Sherman Antitrust Act, the

Clayton Act, the Capper-Volstead Act, and the Cooperative Marketing Act. Federal and state assistance programs have also impacted the development of agricultural cooperatives.

Most agricultural cooperatives are for profit businesses. Cooperative profits are subject to state and federal income tax at either the cooperative or patron level. Cooperatives can choose between qualified and non-qualified patronage returns. In qualified returns the cooperative distributes its profit to the patrons each year. The qualified returns are a deductible expense for the cooperative, eliminating its taxable income liability. However, the qualified returns are taxable income for the cooperative's patrons (regardless of whether the patron receives cash or stock dividends). The redemption of stock dividends from qualified returns does not result in additional tax liability since the distribution of the stock was considered taxable. In non-qualified returns the cooperative pays taxes on its annual income and individual members do not have a tax liability. However, when the cooperative distributes non-qualified returns, the funds are a tax deductible expense for the cooperative and taxable income for the members. In the long run both qualified and non-qualified are equivalent (Kenkel et al., 1998).

Sections one and two of the Sherman Act (1890) contains some restrictions to cooperatives. Section one forbids contract combinations, and conspiracies that "unreasonably" restrict trade. Section two prohibits control prices or any action that reduce competition, thereby getting monopoly power, over an economic market (Agricultural Cooperative Service).

The concern in the 1900's that agricultural organizations could restrict trade is reflected in section 6 of the Clayton Act. Section 6 specified that antitrust laws should not be used to prohibit agricultural associations having capital stock. While Section 6 made it clear that forming a cooperative was not a violation of law, it did not protect agricultural cooperatives from restraint of trade prosecution (Agricultural Cooperative Service).

In 1922 the Capper-Volstead Act was enacted, providing more specific protection for cooperatives from prosecution under antitrust laws. For example, the Act provides agricultural producers the right to make associations with or without capital. The act also specifically

discusses the right of cooperatives to handle and market member products and engage in collective marketing activities. Finally, the act authorizes members to create contracts and agreements to achieve their goals (Agricultural Cooperative Service).

Oklahoma Cooperative Legislation

Legal foundations related to Oklahoma cooperatives include the Oklahoma Marketing Act of 1926 and the Oklahoma Cooperative Marketing Association Act (Title 2, chapter 4, sec 331-361). The 1926 Marketing Act establishes that producers, joined in marketing associations, are allowed to "acquire, exchange, interpret, and disseminate past, present, and prospective crop, market, statistical, economic, and other similar information" among themselves or other cooperatives (Agricultural Cooperative Service). Some of the main constraints included in the Oklahoma cooperative marketing act are: one member-one vote, return on equity capital limited to 8%, and the prohibition of conducting more than 50% of the business with non-members. Another restriction is that profits must be distributed to members on the basis of business volume, not equity investment (Kenkel et al., 1998).

These legal restrictions have provided some disadvantages for the development of value-added enterprises. The one member-one vote limitation coupled with the limited return on equity capital reduces the incentive to own cooperative stock. The distribution of profits based on business volume also limits the ability of cooperatives to attract equity investment from non-members. The restriction that a cooperative must conduct at least 50% of its business volume with members limits the ability of cooperatives to diversify into non-traditional enterprises. However, many cooperatives have avoided this limitation by forming Limited Liability Companies (LLC) or traditional corporations (Kenkel et al., 1998).

Incentive Programs for Cooperative Value-added Activities

Assistance programs influence the success of value-added activities. For example, North Dakota created the Agricultural Products Utilization Commission (APUC), which provides funds for feasibility studies, research for potential markets, organization of new co-ops, and engineering studies for possible facilities. Assistance programs such as APUC help cooperatives in developing business plans, obtaining bank loans, or attracting potential investors (Kenkel et al., 1998).

Oklahoma legislators have created some incentives to promote value-added activities. Oklahoma law ξ68-2357.25v1 allows a credit against the tax imposed by section 2355 of title 68 of the Oklahoma Statutes for investments by Oklahoma producers in Oklahoma agricultural processing cooperatives, ventures, and processing marketing associations. The investor must be the owner of a processing plant or marketing association, but the facility must do more than store, clean, or transport agricultural commodities. The year credit for the period 1997-98 was 30%. For the calendar year 1999, and all subsequent years, the credit can not exceed 30%, but a lower limit can be established (Oklahoma State Senate, 1998). In addition, agricultural commodity-processing owners may exempt from state income tax, 15 percent of the total investment in facilities beginning in 1997.

Another incentive is the quality job program, which provides quarterly cash payments up to 5% of new taxable payroll to qualifying companies for up to 10 years. In general, the company must achieve $25 million taxable payroll during the first year in the program, and 75% of total sales to out-of-state customers. A lower payroll may qualify if the enterprise is located in targeted areas or engages in certain food processing or research and development projects after 1999 some restrictions will apply. Enterprises, not qualifying for the quality job programs because of size restrictions, can apply for a similar program for small businesses (Oklahoma Department of Commerce).

Other support programs are the creation of the task force on agriculture cooperatives and research grants. Oklahoma House Bill 2823 authorizes a 15-member task force on agricultural cooperatives to develop policy recommendations for product development and marketing oriented agricultural cooperatives (Oklahoma House of Representatives). The Engrossed House Bill 1197, section 4, is related to the "Oklahoma Agricultural Enhancement and Diversification Act". This bill made available loans and applied research grants for (not limited to) focused research which enhances the value of an agricultural product or by-product, feasibility studies, product development cost, and projects that are driven by an entrepreneur or the industry (Oklahoma State Senate, 1997).

Summary

Cooperatives are a special type of organization that differs from an investor-oriented corporation in ownership, governance, return to capital and profit distribution. For example cooperative's members authorize board members to make decisions and define policies and strategic plans for the cooperative. Elected board members work with the manager of the cooperative in leading the cooperative. Even though cooperatives have some defined characteristics, some states in the northern plains have developed a structure called new generation cooperatives. These cooperatives have been successful in value-added activities and they have special features that may provide a competitive advantage over the traditional cooperative structure. In addition to the internal special characteristics of cooperatives the legislation of external factors affect cooperatives' performance. The legislation for cooperatives has been modified several times during the history and they allow farmers to join and work collectively with some restrictions. Today Oklahoma authorities are making efforts to enhance competitiveness of value-added enterprises by providing incentives for this kind of activities.

CHAPTER III

PROCEDURES AND RESULTS

This chapter presents description of the survey population, procedures and results of the various analysis performed. The first section of this chapter analyzes attitudes of the responding board members and managers toward value-added activities. The analysis was initiated by computing frequencies for all questions. These results were further analyzed through a comparison of means to determine regional differences, level of interest and risk perception toward value-added activities, and willingness to invest in value-added ventures. Because level of interest in value-added activities and willingness to invest were important factors, regression analysis was used in an attempt to identify factors associated with these attitudes. The second section analyzes differences between board members and cooperative managers' attitudes toward value-added enterprises and NGC. This analysis was conducted using a comparison of means test. The next section of the chapter analyzes difference between respondents who have more experience in value-added activities with those who have less experience by using comparison of means test and regression analysis. Table 4 summarizes the analysis performed.

Table 4. Topics addressed and analysis performed to determine attitudes of board members and cooperative managers toward value-added activities

Objective	Topic	Analysis
	Background information	Frequencies
	Involvement in value-added activities	Frequencies
Investigate attitudes and perceptions of board members and cooperatives managers toward value-added activities and new generation cooperatives	Reasons to initiate value-added activities	Frequencies
	Appropriate value-added activities	Frequencies
	Criteria to select value-added activities	Frequencies
	Attitudes toward NGC	Frequencies
	Limitations to start value-added activities	Frequencies
	Regional differences	Frequencies Comparison of means
	Level of interest and risk perception toward this value-added activities	Frequencies Comparison of means Logit regression
	Maximum investment cooperative leaders are willing to provide for a hypothetical enterprise that projects a return of $0.25/annual/per bushel	Frequencies Ordinary least square regression
Identify similarities and differences between managers and board members toward value-added activities and new generation cooperatives	Differences between board members and managers' attitudes toward value-added activities and new generation cooperatives	Comparison of means
Identify differences in attitudes toward value-added activities based on experience in value-added enterprises	Difference between respondents who have conducted feasibility studies and those who have not	Comparison of means
	Difference between respondents who have initiated value-added activities and those who have not	Comparison of means Logit regression

Survey Population

A sample population of the seven largest Oklahoma cooperatives were chosen for this study based on exploratory research. Managers of the selected cooperatives were contacted by

phone providing a brief description of the study. The same call was used to ask managers if they could help by distributing the survey to the board members during the next regular board meeting. All of the cooperatives offered participation. A complete package was sent to each participating cooperative with a survey for each member of the board and the manager. The package also included return envelopes and a cover letter explaining the purpose of the study. Surveys were filled and returned in less than three weeks with a 100% of rate of return.

All the survey responses were anonymous and did not contain sensitive information. The survey addressed information on age, education, position, level of involvement in value-added activities, and reasons to initiate value-added activities. It also considered preference in potential value-added activities, location of possible business, and criteria for choosing value-added activities. In addition, preference between traditional cooperative and NGC structure and perceived limitation to engage in value-added activities was considered. Samples of the surveys are in appendix A.

Attitudes toward Value-added Activities and New Generation Structure

To investigate attitude and perceptions of managers and board members toward value-added activities and new generation structure for agricultural cooperative frequencies and analysis of means were performed. The following sections present results and discussion of the background characteristics, level of involvement in value-added activities, reasons to initiate value-added activities, and activities considered as appropriate by board members and managers for their cooperatives. There is also a discussion of criteria to select value-added activities, perceptions toward new generation structure, risk perception and perceived limitations to start value-added ventures. The level of interest in value-added activities was analyzed deeply using a logistic regression model. The maximum amount of money that board members and managers are willing to provide as an initial investment in a hypothetical value-added enterprise that

projects a return of $0.25 per bushel was further analyzed using a ordinary least square regression model.

Respondents' Background Characteristics

Table 5 presents the characteristics of the current board members and managers responses.

Table 5. Frequencies in percentages of respondents' background information

Variables	Frequencies
Region.	30.6% respondents from the north west region. 18.4% respondents from the southwest region. 51.0% respondents from the central region.
Role.	85.7% board members. 14.3% managers.
Education.	71.4% of respondents have college or graduate studies. 28.5% have high school or some college.
Age.	42.9% of respondents are between 40 to 49 years old. 26.5% of the respondents are between 50 to 59 years old. 16.3% of the respondents are between 20 and 39 years old. 14.3% of the respondents are more than 60 years old.
Years in the current position.	63.3% have been in their current position for 0 to 9 years. 28.6% have been in their current position for 10 to 19 years. 8.1% have been in their current position for 20 to 40 years.
Acreage farmed.	41% farm less than 1000 acres. 27% farm between 2000 to 2999 acres. 20% farm between 1000 to 1999 acres. 12.3% farm 3000 acres or more.
Percentage of production sold to local coop.	77.6% sell between 50 to 100% of their production to local coop. 22.4% sell between 10 to 49% of their production to local coop.

Background information includes age, education, acreage farmed, percentage of crop sold to their local cooperatives, and years that they have been in their current position. The survey population was almost evenly split between the central area and the western region of the state. The eastern region, in which there are relatively few cooperatives, was not represented. Managers represented 14.3% of the respondents since there is only one for each cooperative.

Over 70% of the respondents had college and post graduate degrees, and the average length of formal education was 15.42 years. Almost 43% of the respondents were between 40 to 49-years old. The average age of respondents was 47.69. Almost 64% of the leaders have held their positions for zero to nine years, and 8% have held their position for 20 to 40 years. The average time in their current position was eight years. Almost 42% of the board members farm less than 1000 acres; the average board member farmed 1827 acres. Finally, 77.6% of the respondents routinely market between 50 to 100% of their crops to the local cooperative and 22.4% sell between 10% to 49%. The average percentage marketed with their local cooperative was 87.64%.

Respondents' Involvement in Value-added Activities

Questions #6-#8 investigated the level of involvement of board members and managers in value-added activities. The results on the involvement in value-added activities are presented in table 6.

Table 6. Frequencies in percentage for questions related to level of involvement in value-added activities.

Question	Yes (1)	No (0)
I have investigated adding value-added enterprises to my farm business.	42.9	57.1
Our cooperative has investigated value-added activities.	75.5	24.5
Our cooperative has conducted feasibility studies on value-added activities.	53.1	46.9
Our cooperative has initiated value-added activities.	40.8	59.2
I am aware of a local group outside of our coop that is developing value-added activities.	69.4	30.6

Almost 43% of the board members have investigated individually value-added possibilities for their farm businesses. More than 75% of the respondents expressed that their cooperatives have investigated value-added activities, and more than 50% of the respondents expressed that their cooperatives has conducted feasibility studies. Finally 40.8% expressed that their cooperative have initiated value-added activities, and 69.4% expressed that they are aware of a group outside of the cooperative that is developing value-added activities.

An open-ended question was included to obtain information about what value-added activity cooperatives have considered and initiated. Among the considered activities, eight respondents mentioned frozen dough, eight mentioned flour milling, four of the respondents mentioned extraction of oil from small grains, two mentioned alfalfa dehydration, two mentioned pasta, others mentioned store, soybean, milo, cotton, and fuel business. Among activities in which their cooperatives are actually involved eight mentioned flour milling, one mentioned alfalfa dehydration, one mentioned milo and soybean, three mentioned having a value-added partner, and one mentioned being part of a limited liability company for value-added purposes. Most of the respondents did not answer open-ended questions.

Reasons to Start Value-added Activities

Questions #9-#10 investigated reasons to initiate value-added activities. Summary of reasons to start value-added activities are presented in table 7.

Table 7. Frequencies in percentage of reason that motivate board members and managers to initiate value-added activities.

	Percentage of respondents				Mean *
	Disagree	Neutral	Agree	Strongly agree	
Increase price farmers receive for crops	2.1	2.1	43.8	52.1	4.45
Maintain access to the market system	2.1	12.8	55.3	29.8	4.04
Increase marketing power	4.2	6.3	54.2	35.4	4.20
Reduce variation in farmers' income	10.9	19.6	45.7	23.9	3.82
Generate long return to investment	2.1	21.3	57.4	19.1	3.85
Take advantage of available facilities.	2.1	36.2	48.9	12.8	2.72

* Scale: 1)strongly disagree 2) disagree 3) neutral 4) agree 5) strongly agree

Among the reasons for starting value added activities 52% of people strongly agree that increasing the price for farmers is important. In descendent order 54.2% agree that increasing marketing power is important. More than 29% of the respondents strongly agree that maintaining access to market was a reason to start value-added activities. Less than 24% strongly agree that reducing variation in farmer's income is an important reason to start value-added activities. Finally, 12.8% strongly agree that taking advantage of available facilities is a reason to start

value-added activities. It should be noted that even the factor that got the lowest ranking is considered as important a reason for more than 50% of the respondents, but its average was below neutral. The survey provided an open-ended question to allow respondents to include other reasons for starting value-added activities. Only one person answered this question, and he said it was "for survival."

Opinions about Cooperative Activities

Question 11 investigated what activities the respondents considered appropriate for their cooperatives to be involved in. Table 8 presents frequencies of the results obtained.

Table 8. Frequencies in percentage of the agreement of board members and managers about activities considered appropriate for their cooperatives.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Our cooperative should work on enterprises relating to agriculture.	2.1	16.7	10.4	58.3	12.5
Our cooperative should develop value-added products based on current crops.	2.0	12.2	24.5	53.1	8.2
Our cooperative should develop market outlets for alternative crops.	2.0	2.0	2.0	30.6	46.9
Our cooperative should develop value-added business in any profitable area.	2.0	6.1	24.5	46.9	20.4
Our cooperative should try and diversify outside of its current geographic area.	4.1	14.3	36.7	34.7	10.2
Our cooperative should form joint ventures with other cooperatives.	2.0	4.1	14.3	55.1	24.5
Our cooperatives should form joint ventures with a food industry firm.	2.0	4.1	53.1	24.5	16.3
Our cooperative should vertically integrate.	2.1	10.6	44.7	27.7	14.9

Nor surprisingly, board members felt that their cooperatives should develop activities, which would directly enhance their farming operation. More than 50% of the respondents agreed

that their cooperatives should concentrate on agricultural enterprises, and more than 50% agreed that their cooperatives should develop value-added products based on current crops. However, almost 47% of respondents strongly agree with the idea that their cooperative should develop market outlets for alternative crops, and more than 67% of respondents strongly agreed that their cooperative should develop value-added business in any profitable area. Almost 45% of the respondents strongly agreed that their cooperative should diversify outside of its current geographic area, and almost 80% of respondents agreed or strongly agreed that their cooperative should form joint ventures with other cooperatives. Only 40.8% of the respondents agreed with the idea that their cooperative should form joint ventures with a food industry firm and the remainders were neutral or disagreed. This situation shows that most leaders would prefer joining other cooperatives rather than a food industry firm. Finally, 42.9% agree or strongly agree with idea that their cooperative should vertically integrate, with the remainder neutral or disagreeing.

Factors as Criteria to Select Value-added Activities

Question 12 investigated factors, which cooperatives should use as criteria to select value-added activities. Table 9 summarizes respondents' opinions.

Table 9. Frequencies in percentage of the level of importance of certain factors used as criteria to select value-added activities.

	Very important	Moderately important	Slightly important	Not important
Relationship to existing crops.	54.2	37.5	8.3	
Long-term return to investment.	87.5	12.5		
Location of the production facility.	29.8	36.2	29.8	4.3
Riskiness of the venture.	87.2	10.6	2.1	

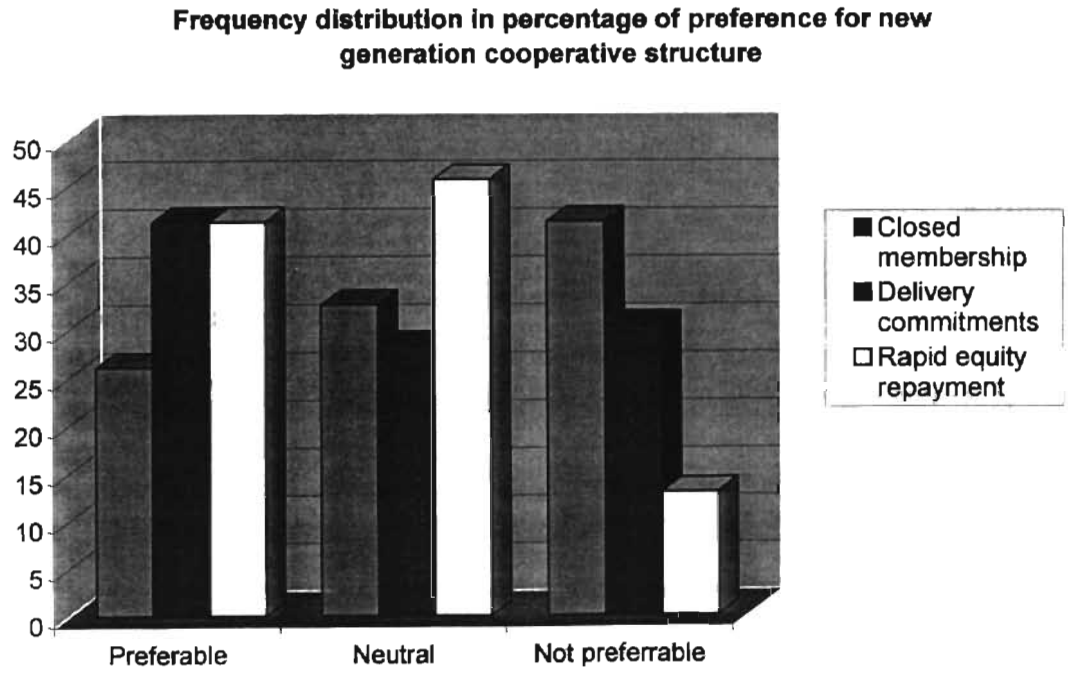
The riskiness of the venture and return to investment were considered the most important factors. Almost 88% of the respondents considered long return to investment of value-added activities as very important criterion. It was followed by the riskiness of the venture, which was very important by 87.2% of the respondents. The relationship of a value-added activity to

existing crops was considered very important by 54.2% of the respondents. Finally, the factor perceived as least critical was the location of the production facility. Only 30% considered the location of facilities to be very important. However, the average ranking was 2.08, which in its respective scale means moderately important. An open-ended question was included to allow respondents to include any other criterion that had not been included in the survey but responses were not recorded.

Attitudes toward New Generation Cooperatives

To obtain perceptions toward new generation cooperatives board members and managers were asked about their preference for three new generation characteristics: high initial investment and fast equity repayment, delivery commitments, and closed membership. Frequencies for the preference for new generation structure are presented in figure No. 1.

Figure No. 1: Frequencies of preferences toward new generation cooperative structure.



Among new generation characteristics rapid equity repayment and delivery commitments had better acceptance than closed membership. Figure No. 1 shows that approximately 40% of respondents considered rapid equity repayment and delivery commitments preferable. Forty five percent of respondents were neutral about rapid equity repayment, and about 30% of respondents were neutral about closed membership. In addition, more than 40% of respondents perceived closed membership not preferable, and slightly more than 10% of respondents perceived rapid equity repayment as not preferable. It is clear that closed membership was the least appealing characteristic. The fact that 45% of the respondents were neutral about high initial investment and rapid equity repayment may be an indicator of lack of information about NGC structure, which may limited the respondents' ability to provide ratings. Interestingly enough only 10% of respondents found all three characteristics preferable and the remaining had a combination of preferences among the three new generation characteristics.

Perceived Limitations to Start Value-added Activities

Question #19 investigated factors perceived as limitations to starting value-added activities. A Summary of the results is presented in table 10.

Table 10. Frequencies in percentage of the factors that were perceived as limitations to initiated value-added activities.

	Yes (1)	No (0)
Identifying possible enterprises	64.6	35.4
Market access.	64.6	35.4
Technical knowledge.	64.6	35.4
Initial investment.	64.6	35.4
Assessing feasibility of new ventures.	41.7	58.3
Market expertise.	60.4	39.6
Scale of operation.	50.0	50.0

Five factors were perceived by the majority of respondents as limitations. Identifying possible enterprises, market access, technical knowledge, and initial investment was considered important by 64.6% of the respondents. Market expertise was considered important by 60.4%. The scale of operation needed for a new venture was considered a limitation by 50.0% of the

respondents. Assessing feasibility for new value-added ventures was a less important factor, chosen by 41.7% of the respondents.

An open-ended question was included in case there was limiting factors that were not included in the list. No answers were given. Another open-ended question was included to allow commentaries about value-added activities and cooperatives. Most respondents did not answer that question. Several answers indicated that the current environment requires changes in cooperatives and that initiating value-added activities may help. Others expressed their opinion that cooperatives should cooperate among themselves instead of competing. One person expressed the opinion that the project must be profitable, because if the cooperative fails it may go out of business.

Attitudes toward Value-added Activities by Regions

Since Oklahoma agriculture varies greatly across the state, determining differences in perceptions in value-added issues among managers and board members from cooperatives located in different regions is important. Respondents were divided according to the region and a comparison of means was performed using the Ryan-Einot-Gabriel-Welsch (REGWQ) test.

Analytical Framework for Mean Comparison Among Regions Comparison of means was performed among respondents of northwest, central and southwest area using a Ryan-Eniot-Gabriel-Welsch (REGWQ) test, which is considered among the most powerful step-down multiple stage tests currently available (SAS). The test first evaluates homogeneity among all the means subject to evaluation comparing the larger mean with the smaller mean. If homogeneity is found the test stops. On the other hand if homogeneity among means is rejected the test performs a test at the level p-1, in which p is the number of means to be compared. Once again a test for homogeneity is performed. The process continues if homogeneity is rejected and stops if homogeneity is found.

The homogeneity of means is rejected by REGWQ if

$$\bar{Y}_i - \bar{Y}_j \geq \frac{q(\gamma_p; p, v)s}{\sqrt{n}}$$

Where

$\bar{Y}_i$ = mean of group i

$\bar{Y}_j$ = mean of group j

$q(\gamma_p; p,v)$ = The alpha value for the p specific subset of means compared, with v degrees of freedom, and γ_p critical value.

s= Standard error

n= Number of observations.

Results of Comparison of Means Among Regions The information, obtained from the analysis, is presented in table 11. The results indicated several, statistically significant, differences across regions.

Table 11. Variables with statistically different means among regions

Variable	Mean in North West region	Mean in South West region	Mean in Central region
Risk perception II*	0.86	0.44	0.68
Our cooperative has initiated value-added activities.**	0.20	0.88	0.20
I am aware of a group outside of our cooperative that is developing value-added activities.**	1.00	0.55	0.56
Our cooperative should develop value-added businesses in any profitable area.***	3.40	4.22	3.84
Our cooperative should try and diversify outside of its current geographic area.***	2.73	4.00	3.44
Acres farmed by board members.	1829	2854	1499
Maximum amount those respondents are willing to invest when the feasibility study projected a return of $0.25/bushel.	9.19	1.72	1.96

Scales: * Value-added activities are more risky (1), neutral and less risky (0)
** Yes (1), No (0).
***Very important(1), Moderately important(2), Slightly important(3), not important(4)

Collapsing the neutral and less risky categories and leaving the more risky as the second group created the variable risk perception II. The northwest region has the highest risk perception toward value-added activities, followed by the central region and then by the southwest region. More respondents of the northwest region also indicated they were aware of groups outside of their cooperatives that were developing value-added activities. Respondents from the southwest were much more likely to indicate that their cooperatives should develop value-added businesses in any profitable area than those in the central and the northwest area should. Respondents from the southwest, also, were more willing to diversify outside of the current geographic area. The area of land farmed by board members was larger in the southwest region with 2,854 acres, followed by the northwest region with 1,829, and then by the central region with an average of 1,499. The maximum amount those leaders are willing to invest in a hypothetical value-added enterprise returning $0.25 per bushel each year also varied across regions. Respondents from the

northwest region reported the highest estimate of $9.19, followed by central region with $1.96 and the lowest offer was from the southwest with $1.72. These differences may be considered unreliable since 33% of respondents did not answer it probably because they lacked enough information to provide an estimate.

Level of Interest, and Risk Perception toward Value-added Activities

Question #17 investigated the level of interest respondents have in seeing their cooperatives develop value-added enterprises, and question #18 investigated the risk perception toward value-added enterprises, compared with their current activities. The first step in the analysis was the estimation of frequencies. Summary of frequencies is presented in table 12.

Table 12. Frequencies in percentages of the level of interest and risk perception of board members and cooperative managers toward value-added activities.

Question	Frequencies in percentage
How interested are you in seeing your cooperative develop value-added enterprises?	Highly interested =35.4% Interested = 60.4% Neutral = 4.2%
Compared to your current cooperative operations, how risky would it be for your cooperative to develop new value-added ventures?	Much more risky = 23.9% Slightly more risky = 43.5% Similar level of risk = 28.3% Slightly less risk = 2.2% Much less risk = 2.2%

Only 4.2% of the respondents were neutral about their interest in seeing their cooperative developing value-added enterprises. The remaining 95.8% was highly interested or interested. The mean for this question was 1.68, which fell between "highly interested" and "interested." More than 65% of the respondents perceived value-added ventures as more risky than their current businesses and the remaining perceive that value-added activities have similar or less level of risk. The mean for this question was 2.15, which fell between "slightly more risk" and "similar level of risk." It is closer to "slightly more risk than similar level of risk."

In order to understand the relationship between the perceived riskiness of value-added activities and other attitudes toward value-added strategies, comparison of means were

performed. Table 13 presents means of some variables that were found statistically different at a 0.05 level of significance using REGWQ test.

Table 13. Differences in perceptions toward value-added activities when respondents were grouped by their level of interest in value-added activities.

Questions	Highly interested (mean)	Interested (mean)	Neutral (mean)
Our cooperative should form joint ventures with other cooperative.*	4.29	3.89	2.00
Our cooperative should form joint ventures with a food industry firm.*	3.82	3.37	2.50
Scale of operation as limitation to start value added activities. **	0.23	0.62	1.00
Long term return to investment as criterion to select value-added activities.***	1.05	1.10	2.00

* Strongly disagree (1), disagree (2), neutral (3), agree (4), strongly agree (5)
** Important (1), not important (0).
***Very important(1), moderately important (2), slightly important (3), not important (4).

Respondents who were "highly interested" and "interested" in seeing their cooperative establishing value-added activities are more willing to form joint ventures with other cooperatives. The same situation was found in regard to the willingness to form joint ventures with a food industry firm. However, the level of interest was lower. The scale of operation was considered an important limitation for starting value-added activities by the respondents who were neutral in their level of interest about value-added activities, and was considered less important by respondents who were "highly interested" and "interested" in value-added activities. On the other hand the importance of long-term return to investment, as criterion to select value-added activities was considered very important by respondents "interested" in value-added activities and was found moderately important for those respondents who were neutral in their interest for value-added activities. In order to more thoroughly explore what factors affected interest in value-added enterprises a logistic regression model was developed to identify among the studied factors what are associated with the level of interest in value-added activities.

Analytical Framework for Analyzing the Level of Interest in Value-added Activities The level of interest had two possible outcomes, very interested (1) and interested (0); therefore, disturbances are not normally distributed, and the disturbance terms do not have a constant variance. Hence, it is evident that an OLS model is not optimal. In addition, the response function represents the probability of Y to be either 0 or 1, which means that the mean responses should fall in a range of 0 to 1. This constrained range of output is not common in linear response functions because they may provide values of Y outside of the range 0 to 1 (Neter et al).

An option, for these situations, is the logistic model, that creates an index, which is a linear function of the explanatory variables ($I_t = X_t\beta$). This index has an infinite range and is translated to a 0-1 range using a cumulative density function. It is necessary to use a logistic function, which is sigmoidal, because the index is linear in X but the probabilities are not (Neter et al).

Consider the following model:

$$L(P) = \beta_o + \beta_1 X_1 + \beta_2 X_2 \ldots\ldots\ldots \beta_k X_k + \varepsilon_{ij}$$

In which

L(P) = Is the logit of P.

β_o= Intercept

β_{ij} = Coefficient estimators, j=1 to k (number of independent variables), i=1 to n (size of sample)

X_{ij}= Independent or explanatory variables, j=1 to k, i=1 to n

ε_{ij} = Random disturbance term, j=1 to k, i=1 to n.

The logistic function can be expressed mathematically as follow:

$$P_t = F(I_t) = F(X_t\beta) = \frac{\exp(X_t\beta)}{1+\exp(X_t\beta)}$$

Where

P_t= Probability of Y to be 0 or 1.

I_t = The value of the cumulative logistic function associated with each possible value of the underlying index I_t or $X_t \beta_t$ and

β_t= a vector of unknown parameters

F test is applicable when the data is normally distributed. When the data is not normally distributed Likelihood Ratio test, Wald test, or Lagrange Multiplier test is used. In this analysis Wald test was used. The rationale of the Wald test is that the log-likelihood function (lnL) is a function of β, which is the parameter being estimated. β^{MLE} is by definition, the value of β at which the log-likelihood function reaches its maximum. Initially the restriction that g(β)=0 is tested. If the restriction g(β) =0 is true, then $g(\beta^{MLE})$ should not be significantly different from zero. The Wald test determines whether β^{MLE}, the unrestricted estimate of β, violates the restriction by a significant amount (Kenedy). The coefficients represent the change in the independent variable on the index and not the dependent variable (White)

One criterion used to assess the model fit is the likelihood test.

$$-2\,Log\,L = -2\sum_j w_j \log(\hat{p}_j)$$

Where w_j is the weight of the jth observation.

The regression coefficients are replaced by their maximum likelihood estimates. The null hypothesis is that all the variables in the model are zero (SAS).

Results of Level of Interest in Value-added Activities Regression Analysis The level of interest responses were converted to a variable of two categories, interested and highly interested, because most of respondents fell in those categories. Highly interested was assigned a value of 1 and interested a value of 0. A regression analysis was performed using level of interest as dependent variable. The evaluation was performed in two steps. First, a logistic model was fit. Independent variables were background information, reasons to initiate value-added activities, new generation characteristics, level of interest, risk perception, some activities that respondents considered important, and perceived limitations. The level of interest was the dependent variable. The model presented in table 14 was obtained.

Table 14. Logistic model using level of interest as dependent variable

Variable	Parameter	Wald Chi-square	Probability	Odds Ratio
Intercept	5.511	0.1526	0.69	.
Background information:				
Age	0.760	1.8256	0.17	1.079
Education	-0.120	0.0018	0.96	0.988
Acreage farmed	0.000	0.2372	0.62	1.000
Reasons to initiate value-added activities:				
Increase prices	-1.548	0.8455	0.35	0.213
Market access	0.765	0.3680	0.54	2.150
Joining other co-op	0.050	0.0034	0.95	1.052
Increase market power	0.153	0.0127	0.91	1.165
Stabilize prices	-0.128	0.0223	0.88	0.880
Long return to investment	1.046	0.9891	0.32	2.848
Use of available facilities	-0.395	0.1161	0.73	0.673
New generation characteristics:				
Closed membership	-0.431	0.2962	0.58	0.650
Rapid equity repayment	0.199	0.0004	0.98	1.020
Delivery commitments	0.372	0.2772	0.59	1.452
Other variables:				
Risk perception	-1.320	1.0621	0.30	0.267
Scale of operation	-2.687	4.013	0.04	0.068

-2 log L (P=0.34)

It is evident from the log likelihood test results that the model is not significant and neither are most individual parameter estimators. Variables significant at the 0.25 level were selected to fit a reduced model. The reduced logistic model presented in table 15 was obtained.

Table 15. Reduced logistic model using level of interest as dependent variable

Variable	Parameter	Wald Chi-square	Probability	Odds Ratio
Intercept	-4.1469	3.1681	0.0751	.
Age	0.1005	3.9032	0.0482	1.106
Scale of operation as limitation To start value added activities	-2.3589	5.8474	0.0156	0.095

-2 log L (P=0.0203)

The impact, of a given change in the independent variable on the probability of a respondent being highly interested in value-added activities, can be illustrated by substituting the parameter estimates into the logistic model

The empirical specification of the model is as follow:

L(p) = Bo+AGE+SCLPR

Where:

L(p)= Logit of p

Bo= Intercept

Age= Age of a particular respondent

SCLPR= 0 if scale of operation is not important and 1 if scale of operation is important.

To obtain the probability of being highly interested the logistic response function is used.

$$P = \frac{e^{[Bo+B_1(Age)+B_2(Scale\,of\,operation)]}}{1+e^{[Bo+B_1(Age)+B_2(Scale\,of\,operation)]}}$$

Using the model results from SAS we obtain.

$$P = \frac{e^{[-4.1469+0.1005(47.69)-2.3589(0.52)]}}{1+e^{[-4.1469+0.1005(47.69)-2.3589(0.52)]}} = 0.35$$

The base case represents the probability of being highly interested when age and scale of operation are set at their means. To estimate the probability of being "interested" we need to subtract from 1 the probability of being highly interested. Hence, we obtain 1-0.35=0.65.

When compared the prediction of this model with the actual values it was found that 77.6% of its prediction match the actual values. Table 16 present results obtained using the model and independent variables set at their mean. In fact the proportions obtained almost match the actual proportion in the survey responses.

Table 16. Comparison of the values predicted by the logistic model with the actual frequencies.

Variables	Base	Prob=Highly Interested	Prob= Interested
Age	47.69	0.36	0.64
Scale of operation	0.52	0.36	0.64
Actual frequency		35%	65%

To evaluate the effect of the increase in one year of age, scale of operation was kept at its mean and age was increased by one unit. To evaluate the effect on one unit in scale of operation, since this is a 0-1 variable, the base was set to 0 and 47.69 (mean) for scale of operation and age respectively. The summary is presented in table 17.

Table 17. Effect on probability due to change in independent variables of logistic model using level of interest as predictable variable.

Variables	Prob. of being highly interested		Prob. of being interested	
	Change base	Change Prob	Change base	Change Prob
Age	1	0.023	1	-0.023
Scale of operation	1	-0.503	1	0.503

A year in age increased the probability of being "highly interested" and reduced the probability of being "interested," which may suggest that older people are more interested in value-added activities. In contrast, perceiving the scale of operation as limitation to initiate

value-added activities reduced the level of interest in value-added activities. In this case we may conclude that as the level of interest increase the importance of scale of operation as limitation to initiate value-added activities decreases.

Maximum Amount of Money that Leaders are Willing to Provide as Initial Investment

Question #16 asked how much money per bushel through-put respondents were willing to invest in a hypothetical project for which the feasibility study projects an annual return on investment of $0.25 per bushel. Table 18 shows the frequencies obtained.

Table 18. Maximum amount of money respondents is willing to provide as initial investment in a hypothetical project that returns $0.25/bushel each year.

Variable	Frequencies in percentages
Maximum investment for a project that offer a return on investment of $0.25/bushel.	29% are willing to invest less than 1 dollar. 32% are willing to invest between 1 to 10 dollars 6% are willing to invest between 11 to 20 dollars. 33% did not answer the question.

More than 32% of respondents were willing to provide between $1 to $10.00 dollars, approximately 29% were willing to provide less than $1.00, and the mean for this question was $4.75. It should be noted that 33% of the respondents did not answer it or expressed that more information was needed to decide how much to invest.

Analytical Framework for Analyzing Willingness to Invest Regression analysis is a statistical tool that uses the relation between two variables for diverse purposes (Neter et al). Regression models are useful to determine if relationships between variables exist, to describe the nature or the relationship (positive or negative), to measure the description or prediction capacity of the mathematical equation, and in case of multivariate models to determine the relative importance of each of the predictable variables (Kachigan). The most common method of estimation, ordinary

least square, fit a line which represent the points in which the square of the error term are minimum.

Results of the Maximum Amount of Money Regression Analysis

Since 33% of the respondents did not answered the dependent variable less observations were left for analysis. Three sets of variables, that may have had impact in the maximum amount of money that board members and managers are willing to invest in a hypothetical value-added enterprise, were used. The first set of variables consist of the responses on reasons to initiate value-added activities. The second set consists of attributes toward new generation cooperatives. risk perception toward value-added activities, and level of interest in value-added activities. The third set of variables includes the response to the activities that board of directors and mangers perceive as appropriate. The most significant of each model were taken and a reduced model was fit. The reduced model is presented in table 19.

Table 19. Ordinary least square model using maximum amount of money that board members and managers are willing to provide as initial investment per bushel in a value-added venture that projects a return of $0.25 per bushel/year.

Variable	Parameter	T ratio	Prob.	VIF
Intercept	-3.750	-0.282	0.775	0.00
Background information:				
Years at work.	0.355	1.946	0.075	2.62
Reasons to initiate value-added activities				
Stabilize income.	1.567	1.889	0.083	1.25
Use of available facilities.	2.924	2.214	0.047	1.89
New generation characteristics:				
Closed membership	3.460	2.868	0.014	1.46
Level of involvement in value-added activities:				
Cooperatives that have conducted feasibility study	-3.032	-1.574	0.141	1.82
Awareness of a local group outside of the cooperative that is working in value-added activities.	4.929	2.693	0.019	1.78
Interest and risk perception:				
Level of interest in seeing their cooperative working in value-added activities.	-5.095	-2.367	0.035	1.31
Risk perception	1.707	1.727	0.109	2.23

Adjusted R square =0.59 White, heteroscedasticity, test: P=0.58
Whole model F value=4.649 P=0.0088

The empirical specification of the model is as follow:

Max $= Bo+YWORK+STBY+AVFAC+CLSMB+CFSTUDY+GROUT+INTERES+RISKPR

Where:

Max $ = Is the maximum amount of money respondents are willing to provide as initial investment if the feasibility study projects a return of $0.25/bushel.

Bo= Intercept.

YWORK= Years that respondent has been in his current position.

STBY= Stabilize income for farmers as reason to initiate value-added activities (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree).

AVFAC= Use of available facilities as reason to initiate value-added activities (Same scale as STBY).

CLSMB= Preference for close membership (1=not preferable, 2=neutral, 3=preferable).

CFSTUDY= 1 if respondent's cooperative have conducted feasibility study and 0 if he have not.

GROUT= 1 if the respondent is aware of a group outside that have initiated value-added activities and 0 if it is not.

INTERES= Level of interest to see his cooperative initiating value-added activities (1=opposed 2=slightly opposed 3=neutral 4= interested 5= highly interested).

RISKPR= Risk perception toward value-added activities (1=much less risk, 2=slightly less risk, 3=similar level of risk, 4=slightly more risk, 5= much more risk).

Two of the parameters estimated had unanticipated signs. The first negative sign (-3.032), indicated that the respondents from cooperatives that have conducted feasibility studies were willing to provide less money than those respondents that have not conducted feasibility studies. Respondents, who were more interested in value-added indicated a lower willingness to invest, a result, which has also counter to expectation.

The average amount of money that managers are willing to provide as initial investment in a hypothetical venture with an annual return of $0.25 per bushel was $2.48, and for board members was $5.26. The difference suggests that managers have different training and that they perform this kind of analysis more frequently compared with board members.

The wide variation in individual responses, the relatively high rate of blank responses resulted in a model with relatively poor fit and poor statistical significance. The unexpected sign relation with some variables also suggests that actual factors influencing willingness to invest were not captured in the survey. Because of this we are not able to make significant conclusions about what characteristics influence the amount of money board members and managers are willing to provide as initial investment in value-added activities. The results suggest need for assistance in financial analysis of projects by board members.

Differences between Managers and Board Members

To identify similarities and differences between managers and board members toward value-added activities and new generation cooperatives a Tukey mean comparison test was performed at 0.05 alpha level of significance.

Analytical Framework to Identify Differences between Managers and Board Members

Tukey test uses a pairwise comparison based on a studentized range. Two means are considered different if

$$\frac{\left|\bar{Y}_i - \bar{Y}_j\right|}{s\sqrt{\frac{\frac{1}{n_i} + \frac{1}{n_j}}{2}}} \geq q(\alpha; k, v)$$

Where

$\bar{Y}_i$ = The mean of group i

$\bar{Y}_j$ = The mean of group j

$q(\alpha,k,v)$ = The critical value of a studentized range distribution of k independent normal random variables with v degrees of freedom, and α level of significance.

s = The standard error based on v degrees of freedom.

n_i = size of the group i.

n_j = size of the group j.

Results of Board Members and Managers Comparison

The responses of managers and board members to all questions were compared except questions four, five, and first statement in question six. Those questions were exclusively used for the board member survey. Appendix B shows the means for each question for managers, board members and for the whole group. Variables that showed statistical difference between means of board members and managers are summarized in table 20.

Table 20. Differences in perceptions toward value-added activities between board members and managers

Variable	Board members (mean)	Managers (mean)
New generation members. *	0.04	0.42
Increase prices farmers receive for crops as a reason to start value-added activities.**	4.53	4.00
Location of facilities as criterion when selecting value-added activities.***	1.97	2.71
High initial investment and fast repayment of equities preferred to low initial investment and slow repayment of equities.****	1.82	1.14

Scale:* Member who prefer NGC structure (1), members who prefer traditional structure (0)
**Strongly disagree (1), disagree (2), neutral (3), agree (4), strongly agree (5)
*** Very important (1), moderately important (2), slightly important (3), not important (4)
**** Preferred (1), neutral (2), not preferred (3).

Board members were more likely to list increasing prices farmers receive for crops, as a reason to start value-added activities, than were managers. This is understandable since board members are farmers. Board members, also, considered the location of facilities a more important criterion when selecting value-added activities then managers do, perhaps because they were more focused on transportation issues. In contrast, a hypothetical cooperative structure with high initial investment and fast repayment equity was more popular with managers than by board members. This may be because the managers considered high equity investments as an increase in sources of capital, while board members considered their alternative investment opportunities and financial constrains.

The average risk perception of board members was 2.25, and for managers was 1.57. This indicates that managers perceived value-added activities as more risky than board members did. A possible explanation of the difference is that managers may be more familiar with the competitive environment, and market challenges than board members. In other words, board members may have not had opportunities to analyze deeply the market of value-added products, whereas managers due to their academic training may have been exposed to these issues.

The new generation structure has more appeal to managers than for board members. This may be because managers perceive the new generation cooperative structure as more efficient and competitively responsive. Managers had a mean of 1.14 in a scale of (1) preferable, (2) neutral, and (3) not referable for high initial investment and rapid repayment, they have a mean of 1.42 for delivery commitments, and 1.85 for closed membership. These results may be interpreted as a preference for NGC structure. In contrast board members have a mean of directors 1.82, 1.97, and 2.20 in the same categories. Managers may have a higher preference for NGC structure because they consider it from a management perspective and perceive that it facilitates diversification and marketing responsiveness. In contrast, board members may view the structure from the viewpoint of producers and consider some aspect of the NGC structure as unattractive. For example the option of not having an open membership may make them feel uncomfortable since it would prohibit participation of other neighbors in the community and so on.

Differences between Leaders who have more Experience and those with less Experience

To identify differences among board members and managers from cooperatives with more experience than those from cooperatives with less experience a Tukey test was performed to compare groups that had conducted feasibility study and those, which had not.

Respondents whose Cooperatives have Conducted Feasibility Studies

A Tukey test was used to compare respondents who have conducted feasibility studies and those who have not. Table 21 presents the result obtained from this comparison.

Table 21. Comparison of means in perception about value-added activities between respondents whose cooperative have conducted feasibility studies and those whose cooperative has not conducted feasibility studies.

	Have conducted studies (mean)	Have not conducted studies (mean)
My cooperative has investigated value-added activities **	0.96	0.52
My cooperative has initiated value-added activities**	0.65	0.13
My cooperative should develop value-added business in any profitable area*	4.15	3.34
Our cooperative should form joint ventures with a food industry firm*	3.76	3.17
Percentage of production sold to local coop	80.12	97.66
Increase prices farmers receive for crops as reason to initiate value-added activities *	4.69	4.18
Technical knowledge as limitation to start value-added activities **	0.50	0.81

Scale * Strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5)
** Yes (1), No (0)

Respondents whose cooperatives have conducted feasibility studies also have investigated value-added activities, and have initiated value-added activities. Respondents with experience in feasibility assessing reported a higher willingness to initiate value-added activities in any profitable area and had a willingness to form joint ventures with food industry firms. The percentage of products sold through the local cooperative was also higher for respondents who have not conducted feasibility studies. Increasing the price farmers receive for crops, as a reason to initiate value-added activities, was considered more important by people who have conducted feasibility studies. Those who have not conducted feasibility studies considered technical knowledge more important. Answers for the previously mentioned question, make perfect sense considering that the lack of knowledge may limit the possibility of conducting the feasibility study if we do not consider hiring consultants. In addition, the people who have conducted feasibility studies are more willing to take risks probably because they have more information;

therefore, they have a better idea of what to expect. The fact the percentage of production sold to the local cooperative is high in people who have not conducted feasibility studies may be an indicator of less information about options for their production.

Respondents whose Cooperatives have Initiated Value-added Activities

A Tukey test was used to find differences between respondents whose cooperatives have initiated value-added activities and those respondents who have not. Table 22 presents the summary of the variables that were found statistically different.

Table 22. Comparison of means between respondents whose cooperatives have initiated value-added activities and those whose cooperatives have not initiated value-added activities.

	Have initiated value-added activities. (mean)	Have not initiated value-added activities. (mean)
Our cooperative should develop value-added businesses in any profitable area. *	4.20	3.48
Our cooperative should form joint ventures with a food industry. *	3.90	3.20
Increase prices farmers receive for crops as reason to start value-added activities. *	4.70	4.28
Increase marketing power.*	4.60	3.92

Scale: * Strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5)

Respondents, who have initiated value-added activities, seem to be more willing to develop business in any profitable area, and to form joint ventures with food industry firm. In addition, increasing the price farmers receive for their crops and increasing the marketing power was considered more important for respondents whose cooperatives have initiated value-added activities. Those questions may show a more proactive behavior in cooperatives that have initiated value-added activities.

To identify among the studied factors, which are associated with the probability that a cooperative initiate a value-added activity, a binary logistic model was used. The independent variables provided to the program to choose were background information, reasons to initiate

value-added activities, level of involvement in value-added activities, activities that leaders perceive as appropriate for their cooperatives, factors that are considered important when selecting value-added activities, preference for new generation cooperatives, risk perception toward value-added activities, and perceived limitations to start value-added activities. The dependent variable was whether the respondents' cooperative has initiated value added or not. The model is not discussed because it was found not significant and none of the individual variable's coefficients were significant. Therefore, we may conclude that the data collected with the current sample did not show statistical relationship between the previously mentioned factors and the probability of initiating value-added activities.

Summary

Cooperative leaders seem to be interested in value-added activities. A questionnaire presents means for each question in appendix B, and a set of charts presents the main findings in appendix C. In general it seems that board members and managers had in average college degree, they had some experience in value-added activities, and among the most important reasons to initiate value-added activities were to increase price farmers receive for their crops and increase market power. Board members and managers preferred joining other cooperative than joining other food industry firm. NGC had good acceptation except the closed membership characteristic. Managers liked NGC more than board members, and board members provided more importance to transportation issues and to prices of their crops. Most people perceived similar or slightly more risk in value-added activities compared to their current activity, and are interested in seeing their cooperative developing value-added activities. The most important limitations to initiating value-added activities were identifying possible enterprises, market access, technical knowledge, and initial investment. Most of the variables that identified people with more experience in value-added seem to show proactive behavior.

CHAPTER IV

CONCLUSIONS AND IMPLICATIONS

The purpose of this study was to understand attitudes of the board members and managers of Oklahoma cooperatives toward value-added enterprises. This chapter presents the key contributions to the understanding of cooperative leaders toward value-added activities.

Findings in this study indicated that cooperative leaders are highly interested in developing value-added enterprises. More importantly, the survey revealed that the majority of Oklahoma cooperatives, farmer members, and groups of agricultural producers outside of the cooperative surveyed are already actively investigating or attempting to initiate these kind of projects. These results have important implications for Oklahoma State University and other resource agencies, because the demand for assistance for developing value-added projects may increase. Moreover, extension personnel may anticipate having customers with some level of experience in value-added activities

The results indicate that cooperative board members have both offensive and defensive strategic goals for value-added projects. For example, the results indicated that cooperative leaders perceived that value-added activities could help their organization in maintaining access to the market place and in increasing prices that farmers receive for their crops. In addition, concern about market access and the negative attitude of the respondents toward joint ventures with food industry firms seem to be a defensive strategy since producers are competing in an industry increasingly dominated by large firms.

Other findings showed that respondents viewed value-added projects as an offensive strategy. Respondents perceived value-added enterprises as a means to increase market power and generate long return to investment. This seems to be an offensive strategy that can better position their cooperative in the market place. In addition, the strong agreement with statements that cooperatives should develop joint ventures with other cooperatives and statements express the perceived importance of diversification provided further illustration of these proactive

strategic goals. The reasons to initiate value-added enterprises revealed in the study, could be important for extension personnel when assisting cooperatives in their strategic planning efforts. For example, cooperative concerns over continued market access for existing crops would need to consider different types of projects relative to cooperatives in diversification.

Another major contribution of this research is the identification of key differences between the attitudes of managers and board members. The results indicated that the two groups see value-added activities from a different perspective. Managers tended to view value-added enterprises as a means to better utilizing the organizations' existing facilities, while their perspective as producers influences board members' perceptions. For example, board members were more likely to view value-added enterprises as a means of increasing the net price they receive for their agricultural commodities. While these goals are not mutually exclusive, the discrepancy in goals could be important for groups attempting to assist these management teams in strategic plans because they can anticipate potential divergences in opinions about some issues and think ahead about alternative solutions.

Board members also perceived value-added activities as being less risky than did managers. This may be because board members have less exposure to value-added issues. Managers may have considered details as positioning new products, difficulties of obtaining shelf space in retail stores, and competition with giant food firms, which board members may be unaware of. Providing more information about value-added activities may facilitate future strategic planning effort.

This study also contributed to understanding attitudes of cooperative leaders to the "New Generation" cooperative structure. This alternative structure is relatively recent, and it has not been implemented in Oklahoma. Hence, relatively little is known about the attitudes of managers and producers toward this new structure. The study results indicated that Oklahoma cooperative leaders have, in general, favorable attitudes toward the "New Generation" cooperative structure. Respondents had more positive attitudes toward the financial aspects of NGC in which the initial

investment is high and equity is revolved rapidly. The respondents also had positive attitudes toward establishing delivery commitment, and quality standards for crops. Despite the favorable attitudes toward two of the key characteristics of NGC the respondents were unexpectedly negative toward the concept of closed membership. Managers held more favorable view than board members toward this characteristic did, which may be helpful for promoting purposes, because extension personnel may have support from inside cooperatives.

Unfortunately, the survey results did not provide insights as to why cooperative leaders had less favorable attitudes toward closed membership aspect of the NGC structure, relative to the other components. Because the apparent rationale for recent legislation designed to promote cooperatively organized value-added activities, was the success of the NGC in the Northern Plains, these results highlighted the need for more research on this important issue probably with a more sociological approach. The low preference for closed membership may be due to social reasons like the possibility of reducing participation of a friend or a neighbor in the cooperative. In addition, providing more information about NGC may help to facilitate decisions regarding cooperative structures.

The study also demonstrated that aversion to risk was not considered a strong limiting factor to initiate value-added activities. Value-added activities were not considered as risky when compared with traditional agricultural activities by respondents. These results may be important for extension personnel as they design programs to facilitate value-added activities because they know that aversion to risk is not a factor that reduces cooperative leaders' willingness to start value-added enterprises and they can focus on other issues.

The study also identified regional differences in their perception of risk toward value-added activities, interest in diversifying outside of the cooperative's current territory and reported more value-added activities outside of existing cooperatives. One explanation for these differences is the differential experience in value-added activities across the state. However, to the extent that these differences are not based on lack of information, understanding these

attitudes may be important for legislators and resource personnel attempting to facilitate value-added projects. Legislators and extension personnel may anticipate that demand for technical assistance is going to increase in those areas in which more value-added activities were reported. Legislators may be interested in identifying factors that are responsible for higher development of value-added activities in some areas with respect to the others that have relatively low value-added activities.

The study's results further suggested that the needs of Oklahoma cooperatives, with respect to value-added projects, are likely to change as these groups gain experience. The majority of respondents who had not conducted a feasibility study indicated that lack of technical knowledge was a major limitation to initiating value-added projects. Respondents who had been involved with feasibility studies were less likely to list technical knowledge as a major impediment. This result suggested that outside sources of technical knowledge are available to cooperative leaders. However, managers and board members who are unfamiliar with the value-added market place may need assistance in locating and evaluating reliable sources of outside assistance.

The results provided some insights for legislators attempting to design programs to encourage cooperatively owned value-added activities. The study results indicated that identifying potential value-added markets, analyzing markets, obtaining technical knowledge of food products production processes and obtaining adequate funding were key impediments to the development of value-added projects. Oklahoma legislators interested in increasing value-added activities should focus their efforts in these areas. The recent legislation, which provides grants for feasibility studies and related research for value-added ventures, indicated that Oklahoma legislators are addressing some of the important impediments except providing a source of money for their initial investment.

Finally, it is important to mention the areas in which this preliminary research was less successful in generating insights. While the level of interest in value-added activities varied

across respondents, the analysis of the survey results did not suggest that these differences were associated with easily identifiable characteristics of the respondents or the cooperative. Similarly, the results did not identify any key structural differences between cooperatives that had initiated value-added activities and those that had not.

The results also provided only limited insights into the wide disparity in the stated willingness to invest in a hypothetical value-added project. The study showed that the willingness to invest in value-added enterprises had a weak association with other attitudes such as perception of the riskiness of these activities and attitudes toward "New Generation" cooperatives. Those results stress the need for additional research.

Suggestions for Further Research

Results from this study suggested a need for further research to facilitate supporting agricultural value-added cooperatives in Oklahoma. The knowledge that managers and board members need to perform their duties could be separated in areas of (e.g. finance marketing, feasibility studies, etc.). Then, determine specific training and assistance needs for each group. It is also important to understand how these training needs change as cooperatives gain value-added experience. This would help to allocate more efficiently the money and time available to assist Oklahoma value-added cooperatives addressing the most limiting weaknesses.

Findings also suggested a need for further research with a more sociological approach to understand rationale of the proactive behavior in initiating value-added projects. Some studies have found that sociological factors determine certain behaviors. For example, Kelley Crowley in "Free Riders in Commodity Research and Promotion Programs" found that the farmer's request of a refund of their contribution to the wheat commission was influenced by whether a farmer knows a commissioner or not. Sometimes social and psychological factors affect a producer's decision in additions to profit driven or technical production considerations. In this case it would be interesting to understand why closed membership was not appealing for most of

respondents. It would also be interesting to understand what are the sociological motivations to initiate value-added activities, and what sociological factors affect producers level of interest in value-added activities. This information may help extension personnel to understand other factors, not associated to profit or technical aspects, that affect the decision making process of cooperative leaders.

BIBLIOGRAPHY

Agricultural Cooperative Service. *Positioning Farmer Cooperatives for the Future*. Washington, DC: Government Printing Office. 1987.

Alster, N. "Getting the Middleman's Share." *Forbes*. 154 (1994):108-09.

Barkema, A., and M. Drabenstott. "The Many Paths of Vertical Coordination: Structural Implications for the U.S. Food System" *Agribusiness* 11(No.5, 1995):483-492.

Cobia, D. "New Generation Cooperatives External Environment and Investor Characteristics" Paper presented at Food and Agricultural Marketing Consortium, conference on "Cooperatives: Their Importance in the Future of the Food and Agricultural System," Las Vegas, NV. 16-17 July 1997.

Cook, M. L. "The Role of Management Behavior in Agricultural Cooperatives" *Journal of Agricultural Cooperation*. 9(1994):42-58.

Crop, B. "Change Drive Cooperatives to Add Value" *Journal of agricultural cooperation*. 12(1997):215-16.

Crowley, K. "Free Riders in commodity Research and Promotion Programs" Master thesis. Department of Agricultural Economics. Oklahoma State University. 1998.

Farmer Cooperative Service. *Antitrust Laws*. Washington, DC:Government Printing Office. 1976.

Hoyt, A. "And Then There Where Seven: Cooperative Principles Updated" *University of Wisconsin Center for Cooperatives*. http://www.wisc.edu/uwcc/staff/hoyt/princart.html. 1996.

Ingalsbe G., and C.H. Jr. Kirkman. *Cooperatives in Agribusiness*. Whasington, DC: Government Printing Office. 1988.

Kachigan, S. *Statistical Analysis: An Interdisciplinary Introduction to Univariate and Multivariate methods*. 2nd ed. New York: Radius Press. 1986.

Kenedy, P. *A Guide to Econometrics* 3rd ed. MIT Press, Cambridge, Massachusetts. 1992.

Kenkel P., and C. Lyford. "The potential for New Wave Cooperatives in Oklahoma" *Oklahoma Current Farm Economics*. 70(1977)39-45.

Kenkel P., L. Satterlee, M. Tilley, and A. Barkema. "Value-Added Agricultural Business and New-Generation Cooperatives in Oklahoma" Stillwater Oklahoma: Oklahoma State University. 1998.

Lund, M. "Cooperative Enterprises Share Success through Northcountry Cooperative Development Fund" http://www.mncoop.org/publicationes-enterprises.htm Northcountry Cooperative Development Fund. 1997.

McBride, G. *Agricultural Cooperatives Their Why and Their How*. East Lansing, Michigan: Avi Publishing Company, Inc. 1986.

Neter, J., W. Wasserman, and M. Kutner. *Applied Linear Regression models*. 3rd ed. Irwing Inc. USA. 1996.

Oklahoma Department of Commerce. *Area Development on Line*. http://www.area-development.com/99incen/oklahoma.html 1999.

Oklahoma House of Representatives. *Agriculture* http://www.lsb.state.ok.us/house/98hl_an.html 1998.

Oklahoma State Senate. *ξ 68-2357.25v1 Credit for Investment in Agricultural Processing Cooperatives, Ventures and Marketing Association*. http://www.lsb.state.ok.us/ 1998.

Oklahoma State Senate. *Engrosed House Bill No 1197, Oklahoma Agriculture Enhancement and Diversification Act*. 1997.

SAS Institute Inc. *SAS/STAT User's Guide* Version 6 4th ed. Volume 2. Cary, NC:SAS Institute Inc. 1989.

U.S. Department of Agriculture. "Wheat Cost and Returns." *Economic Research Service*. http://www.econ.ag.gov/Breifing/fbe/car/wheat2.htm 1998.

University of Wisconsin Center for Cooperative. "Criteria for Separating Cooperative Board and Executive Decision Areas" Http://wisc.edu/uwcc/info/criteria.html 1998.

Tortilla Association. "Tortilla Consumption Continues to Grow in U.S. and Abroad" http://www.tortilla-info.com/prrevenue98.htm 1999.

Agricultural Fact Book. "U.S. Agriculture-Linking consumer and producers." http://www.usda.gov/new/pubs/fbook98/content.htm 1998.

White, K. *SHAZAM User's Reference Manual Version 8*. McGraw-Hill Book Company: Vancouver, Canada. 1997.

APPENDIXES

APPENDIX A

BOARD OF DIRECTORS AND MANAGER QUESTIONNAIRES

SURVEY OF BOARD MEMBER ATTITUDES TOWARDS VALUE-ADDED ACTIVITIES BY COOPERATIVES

Oklahoma State University, Department of Agricultural Economics

The purpose of this survey is to help us understand how Oklahoma State University and the Oklahoma Agriculture Cooperative Council can assist cooperatives and producers with value-added enterprises. All individual data will be kept confidential. Thank you in advance for helping us with this survey.

1. Age _____

2. Education level (check one)
__High school degree __Some college __College degree __Post graduate degree

3. How many years have you been on the board of directors? _____

4. How many acres do you farm (owned and rented)? _____

5. What percentage (approx.) of your 1998 production did you market with your local cooperative?
_____

6. Please check all of the following statements that apply:
I have investigated adding value-added enterprises to my farm business. _____
Our cooperative has investigated value-added activities. _____
Our cooperative has conducted feasibility studies on value-added activities. _____
Our cooperative has initiated value-added activities. _____
I am aware of a local group outside of our coop that is developing value-added activities. _____

7. What (if any) value-added enterprise(s) has your cooperative considered?
_____
_____

8. What (if any) value-added enterprise(s) is your cooperative currently involved in?
_____
_____

9. Using the scale provided, please indicate your agreement with the following factors as reasons for farmers and cooperatives to develop value-added activities.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Increase prices farmers receive for crops. _____ Reduce variation in farmer's income. _____
Maintain access to the market system. _____ Generate long return to investment. _____
Increase marketing power. _____ Take advantage of available facilities. _____

10. If the main reason is not included in the previous list, could you tell us what it is?
_____

11. Please indicate your agreement with the following statements using the following rating system.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Our cooperative should concentrate on enterprises relating to production agriculture. ____
Our cooperative should develop value-added products based on current crops. ____
Our cooperative should develop market outlets for alternative crops. ____
Our cooperative should develop value-added businesses in any profitable area ____
Our cooperative should try and diversify outside of its current geographic area. ____
Our cooperative should form joint ventures with other cooperatives. ____
Our cooperative should form joint ventures with a food industry firm. ____
Our cooperative should vertically integrate. ____

12. Please rate the importance of the following factors for cooperatives to consider when selecting value-added activities?

Very important	Moderately important	Slightly important	Not important
1	2	3	4

Relationship to existing crops. _____ Location of the production facility. _____
Long-term return to investment. _____ Riskiness of the venture. _____

As you may know, cooperatives have choices in how they structure equity, membership, delivery rights and other issues. The following questions are concerned with your opinions on alternative cooperative structures.

13. If you were forming a new cooperative, do you think a system with higher initial membership contribution and rapidly repaid equity is preferable to the traditional structure in which membership investment is low but equity capital is revolved over a relatively long period of time?
Preferable Neutral Not Preferable

14. If you were forming a new cooperative, do you think a system of delivery commitments (agreements for members to deliver a specified quantity and quality of product) is preferred to a traditional structure where the cooperative markets any quantity and quality the members deliver?
Preferable Neutral Not Preferable

15. If you were forming a new cooperative, do you think a system in which membership is limited to the initial members and the stock or delivery rights can appreciate in value is preferred to a traditional open membership cooperatives in which members primarily benefit through use of the cooperative's services?
Preferable Neutral Not Preferable

16. Imagine that your cooperative identified a potential enterprise to process wheat. The feasibility study projected a return on investment equivalent to $0.25/bushel processed. What is the maximum amount you would recommend that your cooperative invest per bushel of processing capacity?
$_____/bushel of processing capacity.

17. How interested are you in seeing your cooperative develop value-added enterprises?

Highly interested	Interested	Neutral	Slightly opposed	Opposed
1	2	3	4	5

18. Compared to your current cooperative operations, how risky would it be for your cooperative to develop new value-added ventures?

Much more risk	Slightly more risk	Similar level of risk	Slightly less risk	Much less risk
1	2	3	4	5

19. Which of the following factors are significant limitations to your cooperative developing value-added activities? (Check all that apply)

Identifying possible enterprises	_____	Assessing feasibility	_____
Market access.	_____	Market expertise	_____
Technical knowledge	_____	Scale of operation	_____
Initial investment	_____		

Other (please describe). _____

_____

20. Do you have any other comments related to developing value-added enterprises and/or agricultural cooperatives?

_____

_____

_____

Thank you for your time and valuable information! If you have any questions concerning this survey please contact us at 405-744-9820.

SURVEY OF MANAGER ATTITUDES TOWARDS VALUE-ADDED ACTIVITIES BY COOPERATIVES

Oklahoma State University, Department of Agricultural Economics

The purpose of this survey is to help us understand how Oklahoma State University and the Oklahoma Agriculture Cooperative Council can assist cooperatives and producers with value-added enterprises. All individual data will be kept confidential. Thank you in advance for helping us with this survey.

1. Age _____

2. Education level (check one)
__High school degree __Some college __College degree __Post graduate degree

3. How many years have you been in your present management position? _____

4. Please check all of the following statements that apply:
Our cooperative has investigated value-added activities. _____
Our cooperative has conducted feasibility studies on value-added activities. _____
Our cooperative has initiated value-added activities. _____
I am aware of a local group outside of our co-op that is developing value-added activities. _____

5. What (if any) value-added enterprise(s) has your cooperative considered?
_____
_____

6. What (if any) value-added enterprise(s) is your cooperative currently involved in?
_____
_____

7. Using the scale provided please rate the following factors as reasons for farmers and cooperatives to develop value-added activities.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Increase prices farmers receive for crops. _____ Reduce variation in farmer's income. _____
Maintain access to the market system. _____ Generate long return to investment. _____
Increase marketing power. _____ Take advantage of available facilities. _____

8. If the main reason is not included in the previous list, could you tell us what it is?
_____

9. Please indicate your agreement with the following statements using the following rating system.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Our cooperative should concentrate on enterprises relating to production agriculture. ____
Our cooperative should develop value-added products based on current crops. ____
Our cooperative should develop market outlets for alternative crops. ____
Our cooperative should develop value-added businesses in any profitable area ____
Our cooperative should try and diversify outside of its current geographic area. ____
Our cooperative should form joint ventures with other cooperatives. ____
Our cooperative should form joint ventures with a food industry firm. ____
Our cooperative should vertically integrate. ____

10. Please rate the importance of the following factors for cooperatives to consider when selecting value-added activities?

Very important	Moderately important	Slightly important	Not important
1	2	3	4

Relationship to existing crops. _____ Location of the production facility. _____
Long-term return to investment. _____ Riskiness of the venture. _____

As you may know, cooperatives have choices in how they structure equity, membership, delivery rights and other issues. The following questions are concerned with your opinions on alternative cooperative structures.

11. If you were forming a new cooperative, do you think a system with higher initial membership contribution and rapidly repaid equity is preferable to the traditional structure in which membership investment is low but equity capital is revolved over a relatively long period of time?
Preferable Neutral Not Preferable

12. If you were forming a new cooperative, do you think a system of delivery commitments (agreements for members to deliver a specified quantity and quality of product) is preferred to a traditional structure where the cooperative markets any quantity and quality the members deliver?
Preferable Neutral Not Preferable

13. If you were forming a new cooperative, do you think a system in which membership is limited to the initial members and the stock or delivery rights can appreciate in value is preferred to a traditional open membership cooperatives in which members primarily benefit through use of the cooperative's services.
Preferable Neutral Not Preferable

14. Imagine that your cooperative identified a potential enterprise to process wheat. The feasibility study projected a return on investment equivalent to $0.25/bushel processed. What is the maximum amount you would recommend that your cooperative invest per bushel of processing capacity?
$_____/bushel of processing capacity.

15. How interested are you in seeing your cooperative develop value-added enterprises?

Highly interested	Interested	Neutral	Slightly opposed	Opposed
1	2	3	4	5

16. Compared to your current cooperative operations, how risky would it be for your cooperative to develop new value-added ventures?

Much more risk	Slightly more risk	Similar level of Risk	Slightly less risk	Much less risk
1	2	3	4	5

17. What of the following factors are significant limitations to your cooperative developing value-added activities? (Check all that apply)

Identifying possible enterprises _____ Assessing feasibility _____
Market access _____ Market expertise _____
Technical knowledge _____ Scale of operation _____
Initial investment _____

Other (please describe). _____

_____

18. Do you have any other comments relating to developing value-added enterprises and/or agricultural cooperatives?

_____

_____

_____

Thank you for your time and valuable information! If you have any questions concerning this survey please contact us at 405-744-9820.

APPENDIX B

ESTIMATION OF MEANS

ESTIMATION OF MEANS
B= board members M= Managers W= Whole group

1. Age **B=47.42 M= 49.28 W=47.69**

2. Education level (check one)
__High school degree __Some college __College degree __Post graduate degree

B=15.38 M= 15.71 W= 15.42

3. How many years have you been in your current position? **B=8.07 M= 13.14 W=8.18**

4. How many acres do you farm (owned and rented)? **B=1827.32**

5. What percentage (approx.) of your 1998 production did you market with your local cooperative?
B= 87.64

6. Please check all of the following statements that apply:
I have investigated adding value-added enterprises to my farm business.
B=0.4285
Our cooperative has investigated value-added activities.
B= 0.78 M= 0.57 W=0.75
Our cooperative has conducted feasibility studies on value-added activities.
B=0.57 M=0.28 W=0.53
Our cooperative has initiated value-added activities.
B=0.38 M=0.57 W=0.41
I am aware of a local group outside of our coop that is developing value-added activities.
B=0.69 M=0.71 W=0.69

7. What (if any) value-added enterprise(s) has your cooperative considered?
8 respondents = frozen dough 8 respondents = flour milling
4 respondents = oil extraction 2 respondents = alfalfa dehydration
2 respondents = pasta 1 respondent= soybean, cotton, Milo, and fuel business.

8. What (if any) value-added enterprise(s) is your cooperative currently involved in?
8 respondents = flour milling 1respondent= alfalfa dehydration, Milo, soybean

9. Using the scale provided, please indicate your agreement with the following factors as reasons for farmers and cooperatives to develop value-added activities.

Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
Increase prices farmers receive for crops.	**B=4.53**	**M=4.00**	**W=4.45**	
Maintain access to the market system.	**B=4.09**	**M=3.71**	**W=4.04**	
Increase marketing power.	**B=4.17**	**M=4.42**	**W=4.20**	
Reduce variation in farmer's income.	**B=3.87**	**M=3.50**	**W=3.82**	
Generate long return to investment.	**B=3.80**	**M=4.14**	**W=3.85**	
Take advantage of available facilities.	**B=3.78**	**M=3.33**	**W=2.72**	

10. If the main reason is not included in the previous list, could you tell us what it is?
1 respondent = For survival

11. Please indicate your agreement with the following statements using the following rating system.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Our cooperative should concentrate on enterprises relating to production agriculture.
B= 3.63 M=3.57 W=3.62
Our cooperative should develop value-added products based on current crops.
B= 3.54 M=3.42 W=3.53
Our cooperative should develop market outlets for alternative crops.
B= 3.66 M=3.71 W=3.67
Our cooperative should develop value-added businesses in any profitable area
B= 3.76 M=3.85 W=3.77
Our cooperative should try and diversify outside of its current geographic area.
B= 3.35 M=3.14 W=3.32
Our cooperative should form joint ventures with other cooperatives.
B= 3.92 M=4.14 W=3.95
Our cooperative should form joint ventures with a food industry firm.
B= 3.42 M=3.85 W=3.48
Our cooperative should vertically integrate.
B= 3.37 M=3.71 W=3.42

12. Please rate the importance of the following factors for cooperatives to consider when selecting value-added activities?

Very important	Moderately important	Slightly important	Not important
1	2	3	4

Relationship to existing crops.	**B=1.48**	**M= 1.85**	**W=1.54**
Long-term return to investment.	**B=1.14**	**M=1.00**	**W=1.12**
Location of the production facility.	**B=1.97**	**M=2.71**	**W=2.08**
Riskiness of the venture.	**B=1.17**	**M=1.00**	**W=1.14**

As you may know, cooperatives have choices in how they structure equity, membership, delivery rights and other issues. The following questions are concerned with your opinions on alternative cooperative structures.

13. If you were forming a new cooperative, do you think a system with higher initial membership contribution and rapidly repaid equity is preferable to the traditional structure in which membership investment is low but equity capital is revolved over a relatively long period of time?
Preferable=1 Neutral=2 Not Preferable=3
B=1.82 M=1.14 W=1.71

14. If you were forming a new cooperative, do you think a system of delivery commitments (agreements for members to deliver a specified quantity and quality of product) is preferred to a traditional structure where the cooperative markets any quantity and quality the members deliver?
Preferable=1 Neutral=2 Not Preferable=3
B= 1.97 M=1.42 W=1.89

15. If you were forming a new cooperative, do you think a system in which membership is limited to the initial members and the stock or delivery rights can appreciate in value is preferred to a traditional open membership cooperatives in which members primarily benefit through use of the cooperative's services?
Preferable=1 Neutral=2 Not Preferable=3
B=2.20 M=1.85 W=2.15

16. Imagine that your cooperative identified a potential enterprise to process wheat. The feasibility study projected a return on investment equivalent to $0.25/bushel processed. What is the maximum amount you would recommend that your cooperative invest per bushel of processing capacity?

$_____/bushel of processing capacity.

B= 5.26 M= 2.48 W=4.75

17. How interested are you in seeing your cooperative develop value-added enterprises?

Highly interested	Interested	Neutral	Slightly opposed	Opposed
1	2	3	4	5

B=1.68 M= 1.71 W=1.68

18. Compared to your current cooperative operations, how risky would it be for your cooperative to develop new value-added ventures?

Much more risk	Slightly more risk	Similar level of risk	Slightly less risk	Much less risk
1	2	3	4	5

B=2.25 M=1.57 W=2.15

19. Which of the following factors are significant limitations to your cooperative developing value-added activities? (check all that apply)

Identifying possible enterprises	**B= 0.65**	**M=0.71**	**W=0.66**
Market access.	**B=0.68**	**M=0.57**	**W=0.66**
Technical knowledge	**B=0.68**	**M=0.57**	**W=0.66**
Initial investment	**B=0.65**	**M=0.71**	**W=0.66**
Assessing feasibility	**B=0.46**	**M=0.28**	**W=0.43**
Market expertise	**B=0.63**	**M=0.57**	**W=0.62**
Scale of operation	**B=0.59**	**M=0.28**	**W=0.52**

Other (please describe). **No answers given**

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20. Do you have any other comments related to developing value-added enterprises and/or agricultural cooperatives?

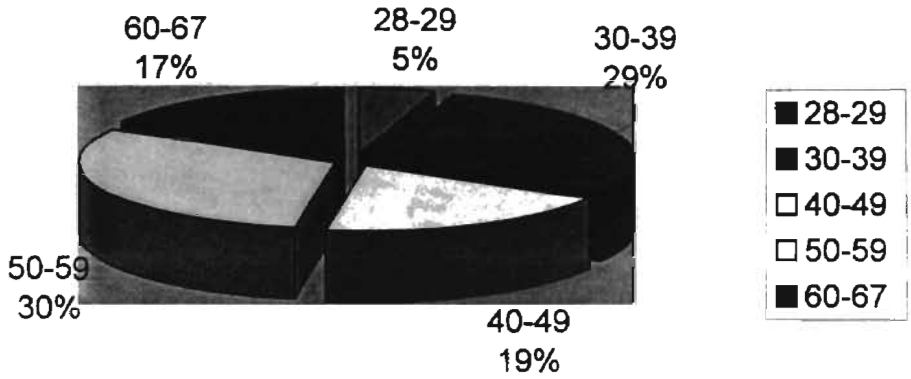
Several answers indicated that the current business environment requires changes in cooperatives and initiating value-added activities may help.

Others expressed that cooperatives should cooperate among themselves instead of competing.

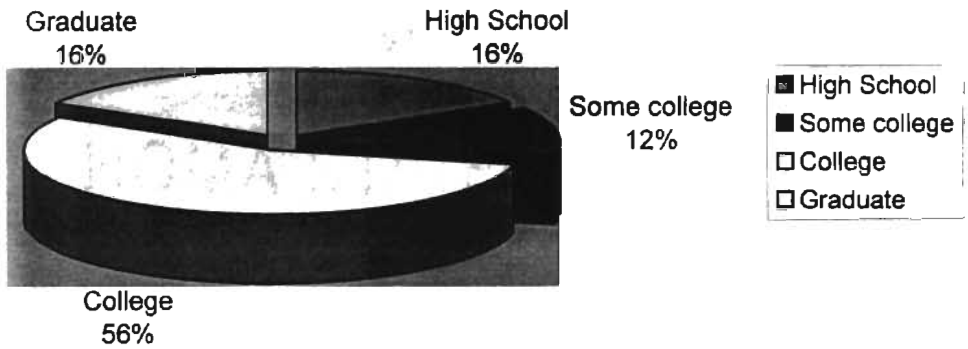
APPENDIX C

CHARTS OF MAIN FINDINGS

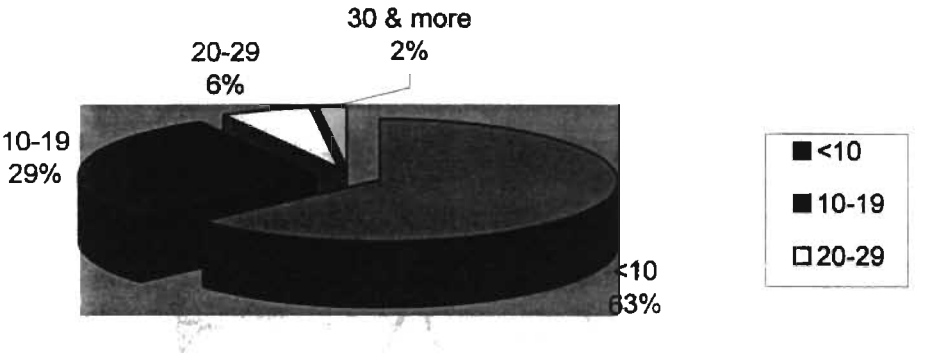
Age frequencies of respondents



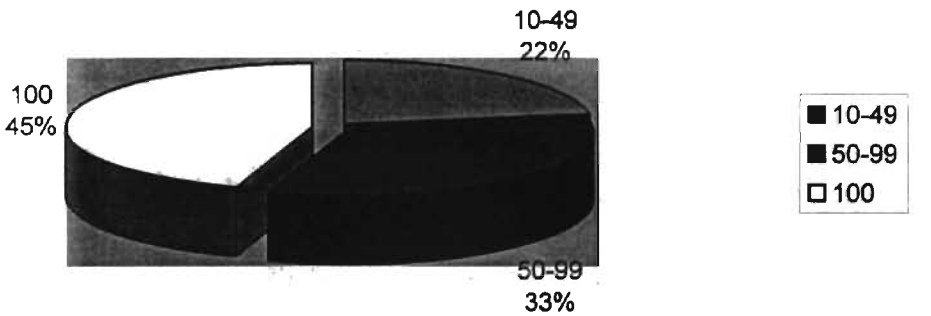
Education level frequencies of respondents



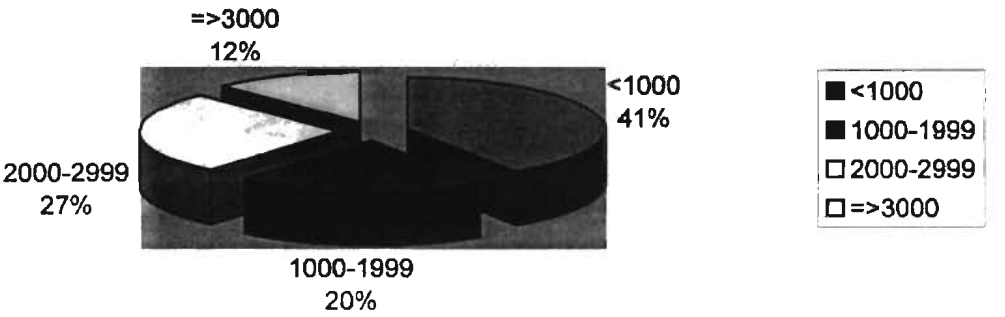
Years that respondents have been in their current positions.



Percentage of board of directors's production marketed with their local cooperative

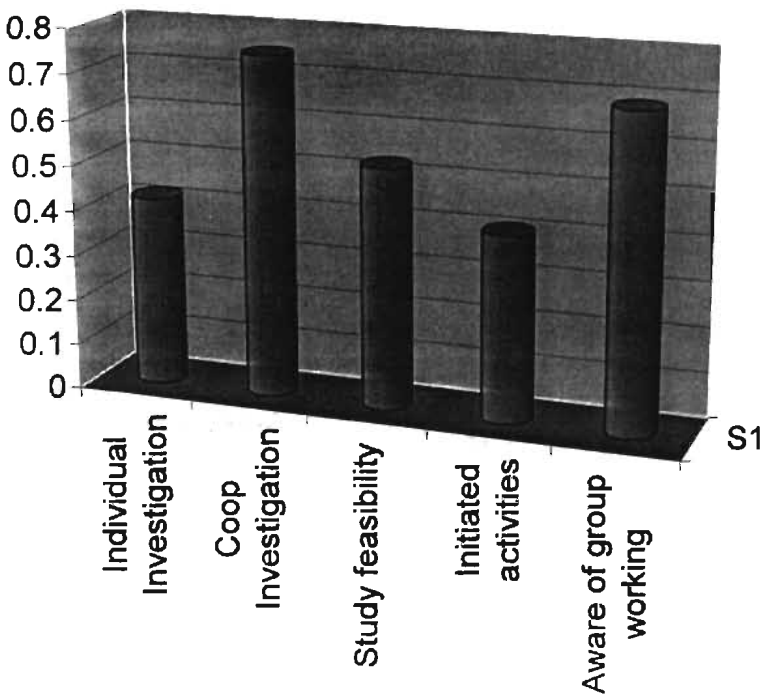


Frequencies of acreage farmed by board members



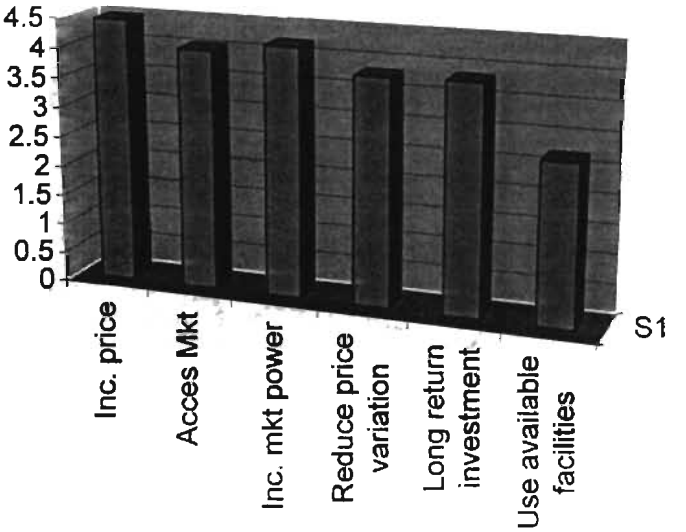
Level of involvement in value-added activities

Yes (1) No (0)



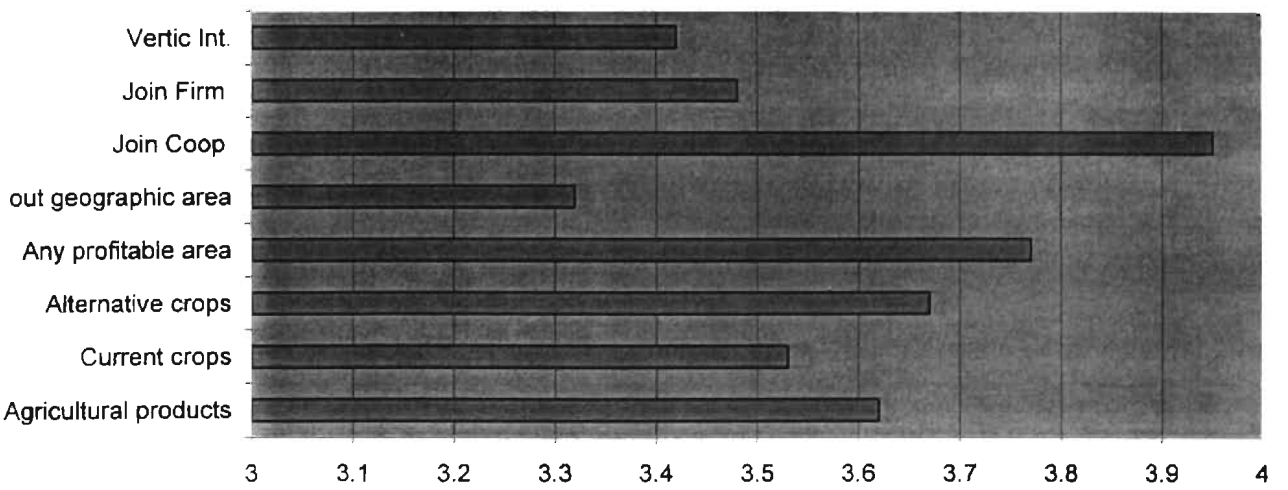
Level of agreement for reasons to start value-added activities

Strongly disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly agree (5)



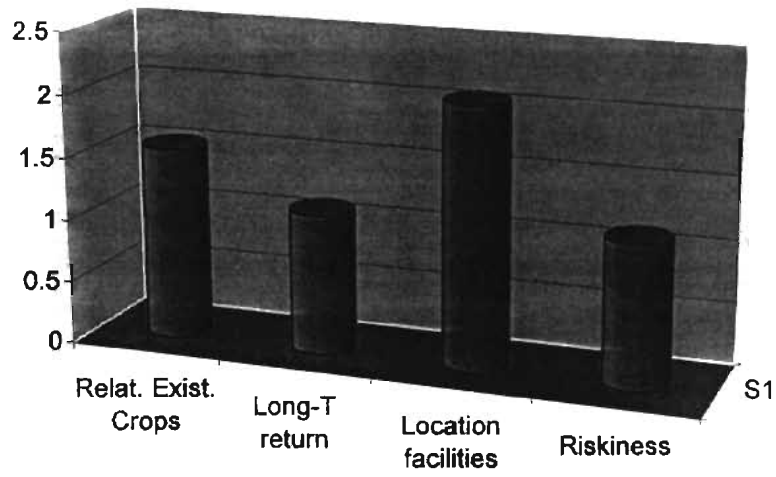
Level of agreement in activities that coops should be involved

Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly agree (5)



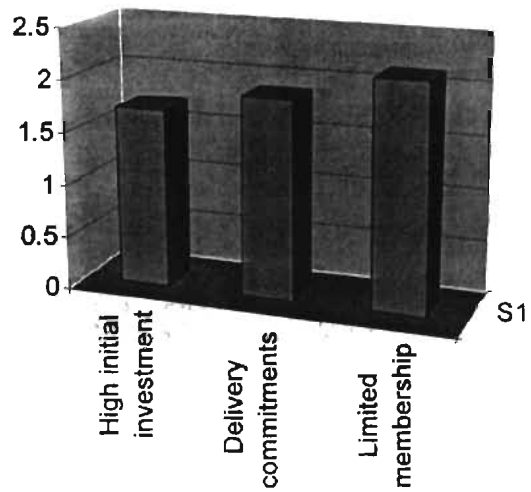
Factors as criterion to select value-added activities

Very important (1) Moderately important (2) Slightly important (3) Not important (4)

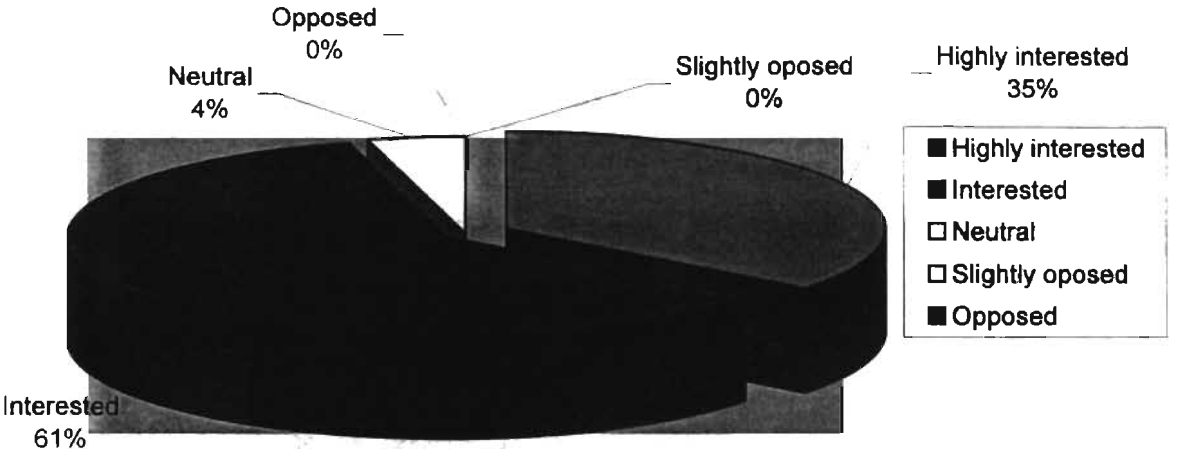


Preference for new generation structure

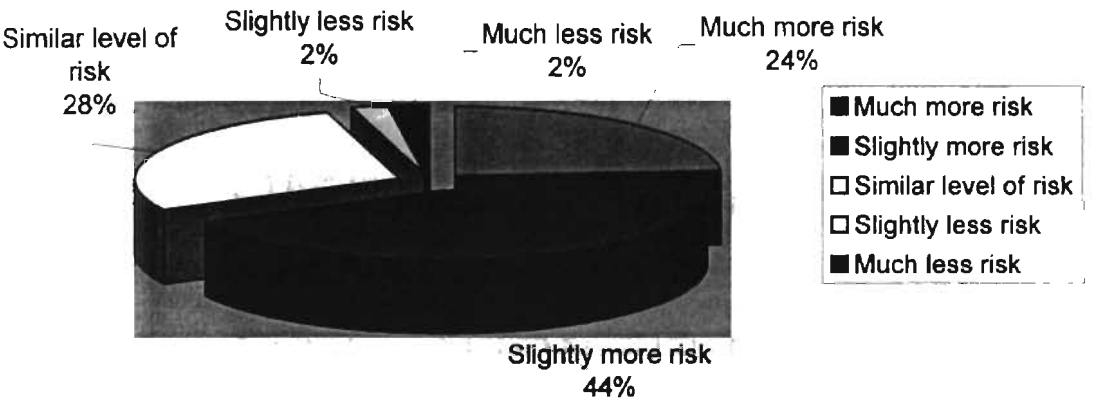
Preferable (1) Neutral (2) Not preferable (3)



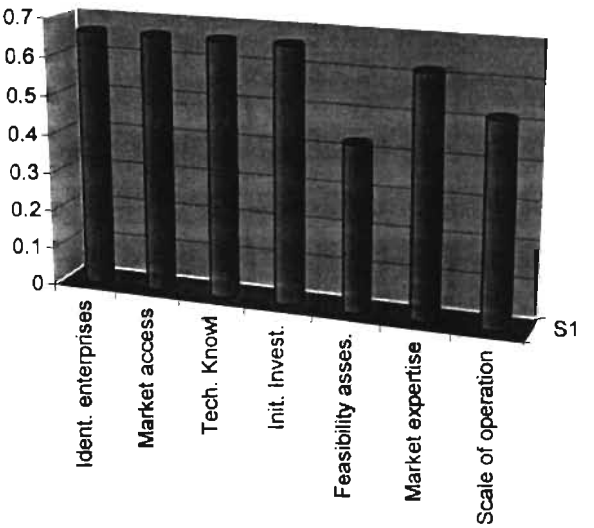
Frequencies for level of interest to initiate value-added



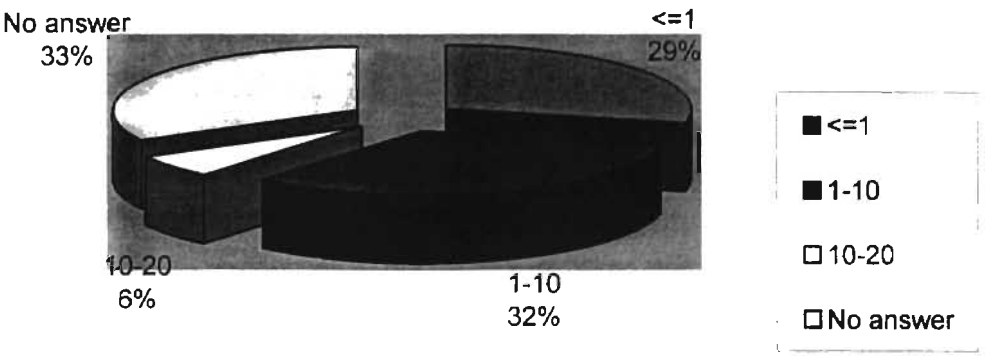
Risk perception toward value-added



Perceived Limitation to start value-added activities
Yes (1) No (0)



Maximum amount of money that cooperative leaders are willing to provide as initial investment in an hypothetical value-added enterprise



APPENDIX D

INSTITUTIONAL REVIEW BOARD APPROVAL

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD

Date:	April 30, 1999	IRB #:	AG-99-027

Proposal Title: "ASSESSING THE ATTITUDES OF COOPERATIVE LEADERS WITH RESPECT TO VALUE-ADDED ACTIVITIES"

Principal Investigator(s): Phil Kenkel
Edwin Acbol

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Signature:

Carol Olson, Director of University Research Compliance

April 30, 1999
Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modification to the research project approved by the IRB must be submitted for approval. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

VITA

Edwin Ac Bol

Candidate for the Degree of

Master of Science

Thesis: BOARD MEMBERS AND MANAGERS' ATTITUDES TOWARD VALUE-ADDED ACTIVITIES

Major: Agricultural Economics

Biographical:

Personal Data: Born in Cobán, Alta Verapáz, Guatemala, on February 24, 1969, the son of Vicente Ac Paau and Margarita Bol.

Education: Graduated from the National Central School of Agriculture, Bárcena, Guatemala in December of 1986; received Agronomist degree in December of 1991; and the degree of Bachelor in Science in Agricultural Economics in December 1994 from Escuela Agrícola Panamericana, Francisco Morazán, Honduras. Completed the requirements for the Master of Science degree with a major in Agricultural Economics at Oklahoma State University in December 1999.

Experience: Employed as extension agronomist providing assistance in coffee production by the Guatemalan Federation of Coffee Producers' Cooperatives (1987); employed by the National Bank of Agricultural Development in Guatemala as Loan Officer (1987-1989) (1992); employed by Escuela Agrícola Panamericana, Department of Agricultural Economics and Agribusiness, specifically by the Agribusiness Development Center as undergraduate research assistant (1993-1994); employed by the Agribusiness Development Center as assistant of the Coordinator (1995); employed by the project Escuela Agrícola Panamericana/ The Postharvest Collaborative Agribusiness Support Program(EAP/CASP) (USAID project) as assistant of the coordinator (1996).